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Electrical Review

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Principal Contents:

	PAGE
Joint Endeavour	589
The Institution of Electrical Engineers	592
Beautifying Waste Spaces. By J. M. Donaldson	594
Electricity in the Home. By H. Smith	595
Uninsulated-return Wiring. By T. C. Gilbert	596
A Subterranean Power Station	597
Starting Glass-bulb Rectifiers. By J. L. North	598
Meetings and Discussions	599
Correspondence:—Armoured Single-core Cables; Electricity in Travancore State; Prepayment Consumers; "Bakelite"—An Explanation; Waste Insulating Material; Domestic Four-wire Services; The E.T.B.I. Ball; The Grid Crossing over the Thames; Proposed Electrical Engineers' Club	603
New Apparatus and Devices	605
Electricity and Shipping	607
Canada's Tariff Concessions	608
Business and Industrial Notes	610
Electricity Supply	614
Traction	616
Communications	616
Contract Information	617
Our Personal Column	619
New Companies Registered	620
Returns of Electrical Companies	620
City Notes	621
Stocks and Shares	621
Published Specifications	623
New Work for Contractors	624

Joint Endeavour

IRONBRIDGE power station, of which a technical description appeared in our issue of September 2nd, and which has now been officially opened by the Minister of Transport, is notable not only as a fine example of British engineering skill, but also as the first station to be built by a Joint Electricity Authority. Three municipalities and a company combined both to increase the efficiency of their existing generation and distribution methods and to build a capital station having an efficiency that would have been unattainable by the extension of their individual plants.

At the inauguration ceremony, Mr. Pybus rightly said that the best advertisement for business abroad was a good example at home. Certainly the generating plant that has been put into commission in Great Britain during the past few years will bear comparison in overall efficiency with that made anywhere.

While our industry may owe something to good fortune (in that the world depression came at a time of its rapid expansion) credit is due to it for its efforts to lower production costs. This favoured position imposes an obligation on the electricity supply industry to do its utmost to help other industries, especially in the provision of cheap power and heat.

The completion of the grid next year should be of material assistance towards this end, as it will enable low-priced bulk supplies to be given to undertakings now struggling with high generating costs, to meet, in the only practicable way, the criticisms of consumers.

We still find it necessary to warn correspondents that the completion of the grid does not mean an immediate electrical millennium. The interconnection of large power stations (which is one of the chief duties of the Central Electricity Board) is no new thing. Indeed, as Sir Andrew Duncan reminded us, the West Midlands J.E.A. had formulated its scheme, voluntarily, before the passing of the 1926 Act, and the prior acceptance of the technical principles underlying that Act has had much to do with the progressive lowering of costs throughout the country for many years.

The duty of distributing the output of the power station still remains in the hands of the local undertakings whether acting individually or jointly, as the West Midlands Authority has done in the extensive rural scheme that Mr. Hetherington has laid out.

Why should joint endeavour stop short at generation in any circumstances?

Electricity in the Motor Industry

THIS year, more than ever before, the importance of electricity in the automobile world is amply demonstrated at the Olympia Motor Show. Every modern car carries what is in effect a miniature power station, comprising a generator and battery, which feeds the lighting circuit, the starting motor, and other electrical refinements. This growing dependence upon electricity has spread to the garages and service stations, which more and more are installing electrical labour- and time-saving appliances. This, of course, is all at the automobile user's end of the industry. In the factories electricity is employed on a very large scale for driving machinery, in heat treatment, for conveyors, and for many other purposes. The motor car industry is one more reminder that the scope for electricity is ever expanding; every new industry must adopt it, and the older industries must constantly increase their demand.

Electrical Ships

THE electrical industry, perhaps more than any other, has justification for always looking well ahead for new fields of activity. Changes are constantly taking place. What have been thought to be well-established and indispensable lines have had to make way for new and better things that have been made possible by the work of inventors and rendered necessary by altered conditions of life or industry. At any turn of the road some new opportunity may present itself. Are there probabilities at the moment upon which some section or other may concentrate with

promise? "A Marine Correspondent" quotes an example on a later page of this issue. He considers that the time has arrived when electrical engineers and manufacturers interested in the electrical equipment of ships ought to co-operate in stimulating this class of business. When owners and builders of ships are seeking ways of improving their efficiency, what can be more timely than concentrated effort on the part of our industry to bring the merits of electricity prominently before them? At present matters are allowed to take a leisurely course until the appearance of a possible equipment contract on the horizon is the signal for a number of concerns to cut against each other. Apart, however, from this aspect of the matter, there is, as our correspondent suggests, everything to be gained by establishing a closer contact between the electrical and the ship-building industries. Enough is not made of the fine work that British electrical engineers have carried out.

Force the Pace!

IT is all very well for us who are in the swim to pride ourselves upon what electricity can do. But if we do not bring its merits before the industries or the people how can we expect early success? We shall not sell any commodity on a large scale when rivals are in the field, however excellent it may be, unless we push it. Special trades and professions need to be strongly approached—we must take definitely appropriate action; electrical propaganda experience has proved this again and again in recent years, and we shall find an unlimited number of other calls for new efforts if we are on the look-out for them. The industry requires new business for all departments, and Nature has drawn no bounds to its possibilities. The present situation summons everybody electrical to put his shoulder to the wheel. Where are the men who are doing their utmost? We know some of them. But who are they who place self-interest or petty jealousy first and the well-being of the whole industry second or third? Name!

Emergency Lighting

THE reliability of electric light for hospitals was effectively demonstrated on Monday when the supply in Islington failed. Two major operations were being performed at the Royal Northern Hospital, Holloway, but the emergency battery instantaneously took up the load through the same lamps and there was no interference with the surgeons' work. The hospital authorities also inform us that if a filament of one of the lamps over the operating table should break a second filament is automatically lighted. Thus the battery easily justifies its installation in such cases.

The Coal Fire

As a kWh will only provide 3,412 B.th.u., which is less than a third of that from a pound of household coal, it is easy to show that, as fuel alone, electricity will not compare with coal in cheapness for long-hour heating. The article on "Electricity in the Home," which we publish on a later page, gives results obtained under ordinary conditions and shows the difference in cost between the two methods. That has to be bridged by relying on other savings due to the use of electricity. The author suggests that if the price for heating were 0.5d. per kWh, the bridge could be made, and as many undertakings do supply heat energy at that figure (the standing charge being considered to cover the cost of lighting), we see no reason to be pessimistic.

Dominion Tariff Reductions

IT is as yet too early to attempt to assess the advantages likely to accrue to British electrical manufacturers from the reductions in the Canadian Customs duties which have resulted from the recent Imperial Conference at Ottawa. Mr. D. P. Dunne, managing director of the Chloride Electrical Storage Co., Ltd., expressed the opinion at a luncheon last week, however, that accumulator makers would derive very little benefit from the concession upon their particular product. This stipulates that to secure free entry accumulators must have plates exceeding in dimension 14in. by 11in. by $\frac{3}{4}$in., and Mr. Dunne suggested that the last dimension was a trifle thick. The alterations are reviewed on another page. The reductions in duties made by the Australian Government a month or two ago seem to be of a more substantial nature, so far as the electrical industry is concerned, but both developments are steps in the right direction, even if their immediate effects are not revolutionary.

Electrical Safety First

No one can speak with more authority than Mr. G. Scott Ram, for many years Senior Electrical Inspector of Factories, on the utter lack of foresight and appreciation of danger exhibited in the design and layout of early electrical equipment. Some of the examples he quoted in his second presidential address to the Association of Supervising Electrical Engineers this week surely justified the issue of the Home Office Regulations, all made to avoid the repetition of accidents which have actually happened, not remote possibilities. Progress is the result of practical experience; mistakes and inadvertence, which point the way to improvement, often occur quite naturally on the impulse of the moment without foolish action on the part of the individual concerned. Indeed, the term "fool-proof" is one to which Mr. Scott Ram is known to object. He thinks it should be reserved for those cases in which abuse may be expected by non-technical users. Even so, the use of the term should not be carried too far. Whatever the electrical engineer may think about his sister, cousin, or aunt, he would hardly popularise himself by presenting any one of them with, say, a hair-curler labelled "fool-proof."

Automatic Control

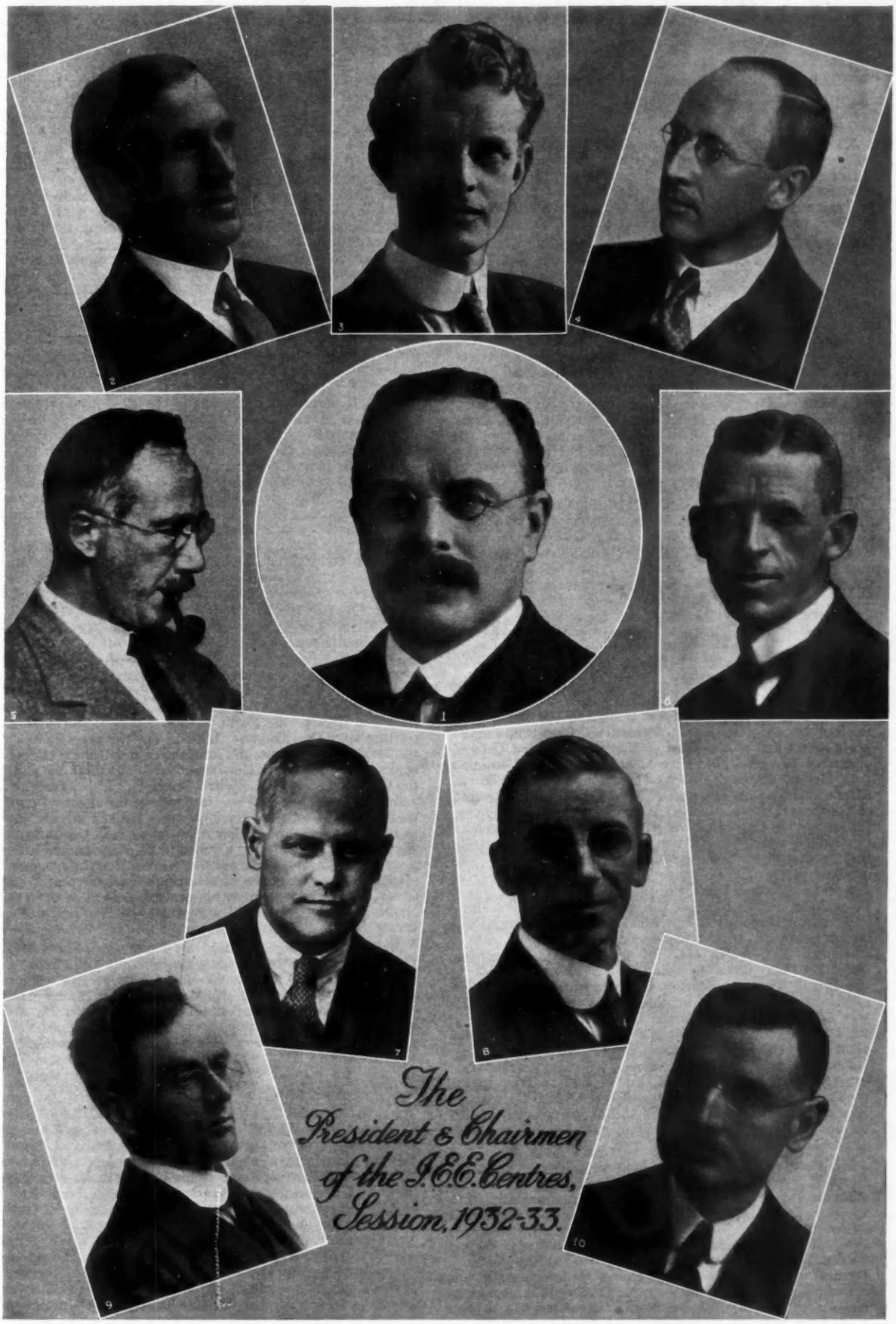
IN his report on the use of electricity in mines, Mr. J. A. B. Horsley, the Electrical Inspector, makes many wise observations on the accidents that were brought to his notice. Two deaths due to shock could have been avoided by the use of electrical interlocks with low-voltage pilot conductors in the flexible cables which would cut off the current from the cable when the plug was out of the socket. Electricity lends itself as nothing else does to automatic control, and full advantage is not taken of its merits unless this quality is exploited to the full, not only in mines, but in every field of its application.

Flame-proof Apparatus

MR. HORSLEY draws attention to the possibility of explosions due to apparatus of flame-proof design which has not been maintained in flame-proof condition. He recommends that one official in each mine should be fully authorised to stop the working of any unsafe apparatus, irrespective of the consequence of the interruption. Such an official should have proper technical qualifications; otherwise his powers might result in costly dislocation of the working of the colliery without doing much to promote safety. But, given an adequately trained man, the enforcement of preventive maintenance should reduce interruptions in service, as has proved to be the case in the Lambton Hetton and Joicey group of collieries in Durham, where the system is in force.

"In Every Sense of the Word"

READERS who have followed the correspondence started in our pages in August by Mr. R. N. Pegg, regarding the need for a club, or some other such organisation, which would provide a meeting-place for electrical men, will have noted with amusement that two doors have now been opened to admit them—subject to conditions. In one case they must be "principals of firms and/or gentlemen in every sense of the word" (which prompts Mr. Abraham to raise a query on another page), while in the other they are only eligible if they are Freemasons.



1. The President, Professor E. W. Marchant (*Lafayette*). 2. Mr. A. C. Livesey (*Elliott & Fry*), Mersey and North Wales (Liverpool) Centre. 3. Mr. R. M. Longman (*Elliott & Fry*), North Midland Centre. 4. Mr. R. S. J. Spilsbury (*Elliott & Fry*), Meter and Instrument Section. 5. Mr. L. B. Turner, Wireless Section. 6. Mr. F. H. Corson, Western Centre. 7. Mr. G. F. Sills, North-Western Centre. 8. Mr. J. Morton (*Elliott & Fry*), South Midland Centre. 9. Mr. C. Turnbull, North-Eastern Centre. 10. Mr. D. H. Bishop, Scottish Centre. (Biographical notes on next page.)

The Institution of Electrical Engineers

Brief biographies of the new chairmen

THIS week the 1932-33 session of the Institution of Electrical Engineers commenced with the President's inaugural address, while the chairmen of several of the centres delivered their addresses. We therefore reproduce, on p. 591 of this issue, the portraits of the President, and the chairmen of the Wireless and Meter and Instrument sections, and of the local Centres. A full account of the work and activities of **Dr. E. W. Marchant,** the President, appeared in the ELECTRICAL REVIEW for June 3rd. Dr. Marchant is Professor of Electrical Engineering in the University of Liverpool.

Mr. L. B. Turner, M.A., the chairman of the Wireless Section, was educated at Bedford School and King's College, Cambridge, where he obtained a Foundation Scholarship. He gained the Mechanical Sciences Tripos, first class, in 1907, and the John Winbolt Prize (University), in 1909. During 1909-10 he was with Siemens Bros., Woolwich, and the Siemens & Halske A.G., Berlin, after which he became assistant staff engineer with the Post Office, and was engaged on wireless research and developments. In 1916 he was appointed to the Signals Experimental Establishment, Woolwich, developing radio apparatus, including the 65-80 metres loop set for forward use. In 1919 he was elected Fellow of King's College, Cambridge, and Director of Studies in Engineering. From 1920-26 he was a member of the Wireless Telegraphy Commission. He is the author of "An Outline of Wireless," published in 1920, and "Wireless," published in 1931.

Mr. R. S. J. Spilsbury is chairman of the Meter and Instrument Section. Mr. Spilsbury was educated at Malvern College and the City and Guilds Engineering College, where he obtained an honours degree in electrical engineering. He commenced his electrical career with the British Thomson-Houston Co., Ltd., at Rugby, with whom he stayed for a short period, leaving the company to join the Anti-Submarine Division of the Admiralty. In 1919 he joined the National Physical Laboratory and since that date has been concerned with the testing and research work on a.c. power-frequency instruments and measuring methods. He is now in charge of the section of the Laboratory Electricity Department which deals with these matters.

Mr. J. Morton, the chairman of the South Midland Centre, received his early technical education at Clydebank higher grade school and at the West of Scotland Technical College, under the late Prof. A. Jamison, and his technical training with Messrs. James & George Thompson, Ltd., Clydebank. After completing his apprenticeship he joined the marine staff of the Cunard Steamship Co., Ltd., as an assistant engineer. On leaving the Cunard Co. he joined Messrs. C. A. Parsons & Co., and for a period of eighteen months was engaged in steam turbine testing, his work including the original 7,300-kW sets installed at the Carville power station of the Newcastle Co. His next appointment was with the Lancashire Electric Power Co., on the operating staff of the original Ringley Road, Radcliffe, power station, the first consumer to be fed from this station being the Acme Spinning Co., in connection with its all-electric mill, which was fed by an 11,000-V overhead line. He left there to join the construction staff of the British Thomson-Houston Co., and was for four years superintending engineer to the Paisley & District Tramway Co. On his return to the Construction Department of the B.T.-H. Co. he visited Malta for the erection of the power plant of the Admiralty long-distance wireless telegraph station. He returned to Rugby as the company's assistant construction engineer. He left the B.T.-H. Co. in 1919 to take up the position of switchgear engineer with Birmingham Corporation Electricity Department, and relinquished this position in 1927 for his present post as chief assistant engineer with the West Midlands Joint Electricity Authority.

Mr. George F. Sills, who has been elected chairman of the North-Western Centre, has been a member of the Institution for over ten years. His family connection with the electrical industry commenced in the early days, as his father, Mr. Francis Sills, was with Sir William Siemens in 1864. His electrical business career commenced with the old Central London Railway; from there he went to Siemens Bros. Dynamo Works, Stafford, and afterwards represented the Switchgear Department at their head office. He was transferred to the Central Power Station Department, and then spent four years in Canada with the Siemens Company of Canada. He spent some time in the Export Department of Siemens Bros. Dynamo Works, after which he was transferred to the Textile Department as chief assistant, before being appointed to the Manchester office. His present position is manager of the northern territory of the English Electric Co., Ltd. Mr. Sills has been a member of the American Institute of Electrical Engineers for nine years, he is on the North Western Area Committee of the British Electrical Development Association, and is a freeman of the City of London and a liveryman.

Mr. D. H. Bishop, B.Sc., chairman of the Scottish Centre, was educated at the Queen Mary Schools, Walsall, and at the Mason University College, Birmingham, where he obtained a Bowen Scholarship for original research for one year. After leaving the college he received further training in the fitting shops of Messrs. Belliss & Morcom, Birmingham. He went to Dundee in December, 1901, and after passing through various departments was given charge of the construction of the Carolina Port generating station. When this was completed he was appointed head of the generating department, and when his chief, Major H. Richardson, resigned in October, 1922, he was appointed chief engineer and manager of the Dundee undertaking, which position he still holds. He is a past chairman of the Dundee Sub-Centre of the Institution of Electrical Engineers.

Mr. F. H. Corson, the chairman of the Western Centre, was educated at Manchester Grammar School, and received his electrical training with Messrs. John Musgrave & Sons, Ltd. In 1898 he joined the Edison & Swan United Electric Light Co., leaving that company in the following year to take up the position of charge engineer in the Bolton Corporation Electricity Department. His next position, in 1902, was as station superintendent and chief assistant with Blackburn Corporation with whom he remained until 1909, when he took up his present appointment as general manager of the Gloucester electricity undertaking. During the period 1913-1929 he was also general manager of the Light Railways Department. He is a member of the Institution of Civil Engineers, Whitworth Society and various local organisations.

Mr. R. M. Longman, the chairman of the North Midland Centre, was educated at Sexey's School, Bruton, and in the Mechanical and Engineering Departments of Finsbury Technical College. He commenced his electrical career in 1902 with the Newcastle-upon-Tyne Electric Supply Co., Ltd., and assisted with the commencement of the supply for the Tyneside electrified lines of the North Eastern Railway, and with the starting up of Carville power station. For two years he was in the Testing Department, and for eighteen months was assistant engineer in the Operation Department. In 1909 he joined the Cleveland & Durham Electric Power Co., Ltd., as technical and testing engineer, and was in charge of the Testing Department, and all technical developments. He left the company in 1921 to become technical superintendent with the Yorkshire Electric Power Co., during a period of development and extensions which included the erection of the Ferrybridge power station and the formation of a transmission system at 33 and 66 kV. In 1929 he took up his present position as operation engineer for the Mid-East England Area of the Central Electricity Board.

Mr. Livesey, the chairman of the Mersey and North Wales (Liverpool) Centre, served his apprenticeship with Brookhirst Switchgear, Ltd., Chester, and subsequently became technical assistant to the directors. He was then sent to take charge of the company's London office, and after two year's work there he was recalled to the works, in 1912, on being appointed assistant general manager. He became general manager of the company in 1919, and in 1920 was elected a director. Mr. Livesey is a member of a number of committees connected with the engineering industry.

Mr. C. Turnbull, the chairman of the North-Eastern Centre, is the borough electrical engineer of Tynemouth. He originally intended to enter the shipping business, but forsook this for the electrical engineering profession. He attended Armstrong College and served his time with Messrs. C. A. Parsons & Co., at Newcastle, where he saw the early days of steam turbine development, including the making of the machinery for the *Turbinia*. On leaving Parsons's works, he went to the Scarborough power station, after which he had electrical experience in various other districts. He was appointed to his present position in 1899. In 1906 the Tynemouth undertaking commenced to take a bulk supply from the Newcastle-upon-Tyne Electric Supply Co., Ltd., and in 1921 the system of supply in the Tynemouth area was changed over from d.c. to a.c.

Mr. F. R. Unwin is the new chairman of the Irish Centre. Mr. Unwin is with the Belfast branch of the General Electric Co., Ltd. He is to deliver his presidential address on November 17th at the Physical Laboratory, Trinity College, Dublin.

Some Driving Forces in the Industry: The Metropolitan-Vickers Electrical Co., Ltd.

1. Sir Felix J. C. Pole (*Lafayette*), chairman. 2. Mr. W. C. Lusk, deputy-chairman. 3. Mr. G. E. Bailey (*Lafayette*), works director and chairman of the Manchester Committee of the board. 4. Mr. P. S. Turner, sales director. 5. Mr. H. C. Pierson, home sales director. 6. Mr. J. S. Peck (*Lafayette*), director and chief electrical engineer. 7. Mr. K. Baumann, director and chief mechanical engineer. 8. Mr. A. P. M. Fleming, C.B.E., director of research and education.

The Galloway Hydro-electric Scheme

CONSIDERABLE progress has been made in the development of the 100,000-kW Galloway power scheme which, when completed, will be one of the largest hydro-electric installations in this country. Parliamentary powers have been granted to the company to raise capital to the extent of £3,000,000. Part of the output will be utilised locally and the surplus sent into the grid southwards to Carlisle and northwards into the Midland area of Scotland.

The scheme is being tackled in two stages. The first, now under construction, comprises two power stations, Tongland (ultimately 33,000 kW) and Glenlee (ultimately 24,000 kW) with three reservoirs along the valley of the Rivers Ken and Dee. The second portion of the scheme will involve the construction of three power stations in series higher up on the Water of Ken above Dalry.

The "Bonnie Doon"

For this purpose it is proposed to utilise water from Loch Doon, which at present discharges by the River Doon—which flows through its "banks and braes" into the Firth of Clyde near Ayr—to supplement water from the Ken, the Deugh Water, and the Black Water Burn. The level of Loch Doon will be raised by damming, and the surplus water beyond what flows down the River Doon will be diverted into a tunnel about a mile long through the watershed into the Ken valley. A second tunnel taps the Deugh Water, while the water of the Black Water Burn will also be led into the common reservoir thus fed from three sources.

Each of the three stations will have its own regulating reservoir; additional storage will be provided in the catchment area on the east of the Ken. The complete installation will thus comprise five hydro-electric stations distributed along the river valley.

Tongland power station will be served with water from Loch Ken, coming down the River Dee and controlled by a barrage at Glenlochar, about three miles from Castle Douglas. The barrage was constructed by Messrs. John Howard and Co., Ltd., and consists of a series of concrete piers, providing six outlets, each 45 ft. wide (the river here being about 300 ft. across) with an additional fish by-pass in the centre. The outlets are closed by steel sluice gates, 9 to 10 ft. deep, the sills of the gates being at river bed level. The gates and equipment were designed, manufactured, and erected by Messrs. Glenfield and Kennedy. The gates can be operated by hand or electrically.

The station dam is being built by Messrs. John Howard and Co., Ltd., at the outlet of the gorge of the river near Tongland village. Messrs. William Taylor and Son will construct an aqueduct of reinforced concrete, about 20 ft. in diameter, from the dam to the station, and will also erect the power station buildings.

To serve the Glenlee power station, a reservoir 1,000 acres in extent at Clatteringshaws, on the moor above High Bridge of Dee, will be built by Messrs. Shanks and McEwen, Ltd. The erection of the dam has involved the diversion of the New Galloway-Newton Stewart road for a distance of about three quarters of a mile, also involving several secondary roads.

The firm of A. M. Carmichael has carried out the diversions, and is now engaged in driving a tunnel, 11 ft. 6 in. in diameter, through three-and-a-half miles from the reservoir to the power station. Over a quarter of a mile of tunnel has already been completed. Contracts are about to be placed for the construction of the power station buildings, for the erection of the pipe line from the end of the tunnel to the station, and certain minor aqueducts in connection with stream diversions.

Connection with the Grid

The 132-kV grid line has been erected from Kilmarnock to Glenlee, and will be continued past Tongland to Carlisle. A branch from the main route has been extended along the tunnel route to the reservoir at Clatteringshaws. The main line will convey energy from the two stations to the grid, but in the meantime the Kilmarnock-Glenlee length is supplying power inwards for the driving of the tunnel and for other building works.

Employment has already been provided for local men, but in an agricultural area the local supply is not sufficient for large undertakings of this nature, and labour will have to be drafted from the industrial areas farther north.

Beautifying Waste Spaces. By J. M. Donaldson, M.I.E.E.*

How the surroundings of power stations can be made attractive

IN every electricity undertaking, particularly the larger ones, there is waste space on generating station and sub-station sites. Sometimes this is due to more land having been bought than is really necessary, or necessary for immediate purposes, and sometimes because the shape of the land is awkward and there are various corners which cannot conveniently be utilised.

Such waste spaces as these undoubtedly always have a tendency to get untidy. A weedy corner of ground is generally the receptacle for odd pieces of iron, bits of waste, and various other kinds of debris—in fact, dirt begets dirt—and it is curious that very often engineers who are, rightly, very particular about the way in which all the corners of their stations and sub-stations are kept seem to pay no attention to the outside premises.

It will probably be found that the cheapest, easiest, and pleasantest solution of the difficulty is to plant trees, shrubs, or flower gardens, or a combination of the three, while the growing of turf often provides a very good way out. If attention is paid to the amenities of the supply authority's property, the staff will be only too ready to respond to it, and will take a pride in keeping their own premises in order. Shrubs, trees, and grass have the advantage that they can be made to appear interesting in the winter as well as in the summer, and for this reason flower beds must be looked upon as an extra rather than a normal part of the equipment.

Rear view of old power station at St. Albans

In towns where garden facilities are bad, often a member of the staff will be only too pleased to utilise an unused part of a sub-station site for growing vegetables, &c., and will in return keep the remainder of the site in order.

The illustrations which appear on this and the opposite page show the excellent results which have been achieved in various parts of the North Metropolitan Electric Power Supply Company's area.

Utilising a Destructor Site

The power station at St. Albans, in its early days, depended entirely on refuse for producing steam. The garden shown in the illustration on the opposite page was laid out some twenty-five years ago when the station was erected. A second (view above) shows the ground at the back of the station after the removal of the destructor, which was approached by an incline up which the refuse carts drew their noisome burdens; the weighbridge, over which all the carts passed, can be seen on the left-hand side of the photograph. A hard tennis court was made on the vacant spot, and, in between this and the roadway, a miniature golf course, while the wooden building at the end is a games and recreation club for the district staff. A grass tennis court has been added, but it cannot be seen in this view, and it is bordered by rockeries made, for the most part, from old concrete from the building. As the chimney served no useful purpose, it was taken down in order to improve the amenities of the neighbourhood. This is a course which might be pursued more frequently, unless the chimney is required for the purpose of supporting a lightning conductor.

The photograph of the entrance to Brimsdown power station indicates a border of flowers, rather in the autumnal stage at the moment, and part of a screen of poplar trees which was planted some two years ago. These poplars are effective, but they are very slow growing, and for some additions to this and another station other trees will probably be used. (The building in the background is an adjacent factory.)

In the picture of the little garden at Chingford, the side view of the showroom appears; the building behind is a sub-station, and to the left of this there are stores and garages. This plot of ground which would otherwise have been a waste and untidy space, has a very pleasant appearance. At the request of a number of the inhabitants the high privet hedge originally planted was cut down so that the garden could be seen readily from the road.

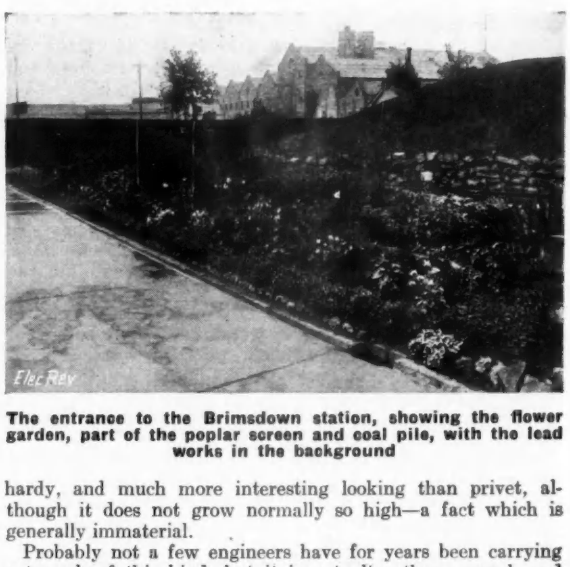
Sub-station Transformers Concealed

A different class of problem is presented at the Vale Road sub-station, Tottenham, in what is now purely a factory road. This sub-station has been extended twice and, on the last occasion, a further plot of ground had to be bought. This was triangular in shape, and, as only a portion could be used, the shrubbery shown on the right was made. All the transformers are out of doors, but are quite screened from the road behind the main building; the breather of one can be seen just on the right-hand edge of the building.

The sub-station gardens at Southgate and Edmonton are in residential areas, and the buildings and gardens are intended to harmonise with those on the surrounding property. This also applies to the sub-station in Hendon Rural, where an outdoor transformer in the rear to the left of the building is concealed by the darkness of the foliage.

The sub-station at St. Albans contains a steel-type mercury rectifier, and outdoor transformers for general supply are situated behind the building. This corner is in a residential part of the town, but had very untidy walls and an exceedingly ugly advertisement hoarding. The addition of the trees and shrubs, which are rather small at present, has very much improved the property on this corner.

At Sewardstone on the borders of Epping Forest another method has been adopted, although the site is a good way removed from any house property. The ground is covered by a combination of gravel, grass, and a hedging shrub which can be strongly recommended for this purpose. The name of this shrub is *lonicera nitida*, and it is quick growing, hardy, and much more interesting looking than privet, although it does not grow normally so high—a fact which is generally immaterial.



The entrance to the Brimsdown station, showing the flower garden, part of the poplar screen and coal pile, with the lead works in the background

Probably not a few engineers have for years been carrying out work of this kind, but it is not altogether general, and it is suggested that the work is very well worth the time and trouble involved.

* Immediate past-president of the I.E.E. and chief engineer of the North Metropolitan E.P.S. Co.

Electricity in the Home. By H. Smith

THE use of electricity is becoming more popular every year with the introduction of really first-class domestic appliances at reasonable cost, but the cheap supply of electricity has not yet arrived.

In comparison with a house run on the combination of coal for heating, gas for cooking, and electricity for lighting and low-consumption utensils, I have found an all-electric house considerably more expensive to work. The average actual expenditure for a house run on the combination over a period of three years worked out at £15 10s., the proportion being gas £6 10s., electricity £4 12s. 8d. at 6½d. per kWh, and coal £4 7s. 4d. These figures were obtained for an ordinary suburban villa of the six-roomed type.

The man earning £250 probably considers £15 10s. per annum a sufficient sum to pay for heating, lighting, and cooking. The £500 a year man may be willing to pay a little more, but he will wish to run his house as economically as possible.

In this period of three years, gas was used only for cooking and for heating the dining room with a ten-burner fire. As each burner of the fire had a rated consumption of five cb. ft. per hour, the gas, at 10d. per therm, cost 2½d. A fire of this size will comfortably warm a room 16 ft. by 14 ft., which is occasionally used, such as a dining room. Electricity was used only for lighting and small appliances, and approximately 170 kWh per annum was consumed; about two tons of coal was burned for general heating and water heating.

In 1929 and 1930 an experiment was made to run the house on electricity, with the exception of water heating by a gas geyser in the bathroom (as no other hot water system was fitted in the house) and for boiling water in the scullery. For these two years the totals were £24 12s. 7d. and £24 7s. 3d. respectively, over £9 per annum more than by the previous method. Electricity was obtained under a domestic tariff of £3 per annum, plus ¾d. per kWh.

In an endeavour to reduce the cost in 1931 coal was resorted to for heating, but unfortunately as 1931 was a very cold year, although the consumption of electricity was reduced, the cost of gas increased, and in addition £2 12s. was spent on coal, giving a total of £27 11s. 4d. These results were very discouraging, but another attempt is being made this year, and up to the end of June the total expenditure was £13 12s. 10d. This again did not seem hopeful, but electricity consumed was only 1,717 kWh for the half year, which is less by 100 kWh than either of the first quarters of 1930 and 1931, which are the heaviest in the year.

Estimating on previous figures the total expenditure for the year will be about £21 or £22. This will be cheaper by £2 or £3 than when the house was all-electric with the exception of water heating.

The annual expenditures for 1928 to 1930 are set out below :--

	1928.		1929.	
Electricity (including meter rent)	£4 12 8	174 kWh	£18 0 0	4,959 kWh
Gas	6 10 1	160 therms	6 12 7	163 therms
Coal	4 7 4	2 tons		
	£15 10 1		£24 12 7	

	1930.	
Electricity	£17 15 5	4,885 kWh.
Gas	6 11 10	162 therms
	£24 7 3	

	1931.		1932. First half year.	
Electricity	£17 0 1	4,482 kWh	£6 17 4	1,717 kWh
Gas	7 19 3	197 therms	4 7 6	106 therms
Coal (part heating)	2 12 0	1½ tons	2 8 0	1 ton
	£27 11 4		£13 12 10	

It is obvious from these figures that general heating by electricity is more expensive than by coal; by separating out the number of kWh used per annum a fair idea of the heating units per day can be obtained. I assume that 200 kWh on the lighting meter would include all small appliances. The average consumption of the cooker was 20 kWh per week, or about 1,000 per annum; deducting 1,200 kWh from the 4,800 used this will leave 3,600 kWh for heating.

It can be assumed that heat will be required on at least 200 days per annum, which is only 18 kWh per day. This is not a great quantity for the distribution of heat in a six-roomed house, and it requires a good deal of careful management to obtain the maximum amount of comfort. Judged from the above results it would appear that electricity, to compare favourably with any combination of coal, gas, and electricity, should be supplied at a flat rate of ½d. per kWh with no extras. Various users of electricity were approached and in each case the amount of energy consumed was negligible where electric lighting only was used, and in some cases, with the combination of gas, coal and electricity, the total bills were as low as £12 per annum. This type of consumer will have to be tempted by much cheaper rates before he will use power extensively.

Supply undertakings should therefore either make a variation in their winter and summer charges to even out the quarterly payments or lower their rates.

Brightening Power Station Surroundings (see opposite page): 1. The old St. Albans generating station; 2, 3, 4 and 6, respectively, St. Peter's Road, Hedge Lane, Watford By-pass, and Wilmer Way sub-stations; 5. A garden at Chingford showroom

Uninsulated-return Wiring. By T. C. Gilbert, A.M.I.E.E.

The case against its adoption

"THE adoption of a non-insulated-return system of wiring is a development likely to occur," said Mr. Howard Marryat, M.I.E.E., in his paper at the E.C.A. Conference at Southport. At a previous E.C.A. Conference an able plea for the adoption of uninsulated-outer concentric systems was made mainly upon the grounds that only by this means could any degree of earthing security be obtained.

From the practical standpoint I can foresee nothing but difficulty following the introduction of the system. In the first place, the use of non-insulated returns is bound up with the allied question of multiple earthing, *i.e.*, the earthing of the neutral of the supply system on the consumer's premises as well as, or instead of, at the generating or sub-station. The use of non-insulated returns would obviously have the effect of earthing the neutral, however inefficiently, at the consumer's premises. Multiple earthing is not permissible in this country, under the Electricity Commissioners' Regulations, but a tendency to consider its adoption appears to be abroad in the industry, and with the able advocacy that the proposal is receiving the position may be altered in the near future.

The many defects of the concentric system are mechanical rather than electrical, in that the earthed outer covering is made up of a large number of small continuity clips or soldered joints (at least four per point). We would not tolerate this in the live conductor, the failure of which can only put the connected apparatus out of action, whereas the failure of any one clip or soldered joint in the outer can cause a potential upon the casings of appliances as well as the outer sheathing beyond the disconnection. The system also calls for completely non-standard accessories, and the simplest extension or alteration becomes difficult.

Foreign Opinion

In the ELECTRICAL REVIEW of August 14th, 1931, there appeared a report of the annual meeting of the Canadian Electrical Association; under the heading "Cheaper Installations" we read—"Bare metal wiring had recently been seriously considered, but as yet no definite conclusions had been reached, —concentric wiring in which an outer metallic sheath was used as the earthed return circuit had been considered by some authorities, but not adopted. Difficulties in making a continuous electric sheath from joint to joint were apparent in this method."

The Canadian authorities are doubtless anxious to introduce cheaper wiring, but they are unable to find anything to recommend concentric systems, or any bare neutral system. In the American reports concentric wiring is not even mentioned. Multiple earthing is extensively if not universally practised in the United States, but in the latest edition of the National Electrical Code we find "Regulation 903-e. The grounded conductor of an interior wiring system shall be connected from one point *only* to the grounding electrode or electrodes."

In a very useful commentary published in the United States, "The National Electrical Code Handbook," by Arthur L. Abbott (McGraw Hill), the following note on this Regulation is given:—"Experiments have been made with a wiring system in which all conductors are in rigid metal conduits and all neutral conductors are bare and thoroughly bonded to the conduit. This gives a multiplicity of points at which the grounded conductor is connected to grounded metal. Such a system seems to operate satisfactorily when installed by skilled and conscientious workmen under rigid inspection and maintained in first class condition, but the system has not been developed to a point where it can be considered suitable for general use."

The advocates of bare neutral wiring in Great Britain claim that such systems are cheap but "skilled and conscientious workmen under rigid inspection" savours rather of extreme expense. Following further experiments bare neutral systems are now definitely barred in the United States under the regulation quoted, obviously for reasons other than cost.

Costs of Installation

Amongst the reasons given for the low cost of concentric or bare-neutral wiring systems is that switches and fuses are required in the phase conductor only, but, with multiple earthing only single-pole switches and fuses are necessary on *any* wiring system, whether utilising a bare or an insulated neutral in the interior installation. There appears to be no doubt as to the economy in wiring due to multiple earthing. Many well-well-known engineers advocate its introduction into this country, and in several noteworthy electrode-boiler installations the existing regulations have been ignored.

Even with the introduction of multiple earthing the question still remains as to whether insulated or non-insulated neutrals shall be used; to my mind the proposal to utilise bare neutrals is wrecked upon the old problem of providing efficient and effective earthing for the neutral upon the consumer's premises.

In towns the neutral of the supply system will probably be solidly earthed to the main water services, which offer reasonably low resistance to earth currents, or, alternatively, to cable sheathings, which may be less efficient. Cable faults or severely unbalanced loads may result in slight potentials upon the neutral, but while the earth connections remain intact, it is unlikely that these will reach a dangerous value.

Mr. T. C. Gilbert

In rural areas there are no extensive water mains, and supplies are given in great part by overhead lines. Long experience of rural electrification abroad has proved the complete ineffectiveness of purely local water supplies for earthing, and such earth connections as are required will probably be made to buried plates or masses of metal, or to driven rods or pipes. Earthing resistances will therefore rarely fall below 25 ohms even under favourable conditions.

In rural installations the neutral must be earthed both at the sub-station and on the consumers' premises. Owing to the high resistance of the earth connections there will always be a potential of varying magnitude present upon the neutral line. Assuming the optimistic value of 25 ohms as the resistance of the earth connection on the consumer's premises (it is far more likely to be 125 ohms) then it only requires a current of 3 A over the earth connection to raise the potential of the neutral to 75 V above earth, 2 A to 50 V, and so on.

The continuous flow of even small currents over the neutral earthing electrodes raises their resistance, owing to the drying of the surrounding soil, thus increasing the neutral potential above earth. No serious results are likely to follow the building up of these potentials upon the neutral, provided they are confined to the neutral line, but with the use of bare neutral wiring systems they would be extended not only to points within reach throughout the internal installation and the earthed appliances, but also to the steel framework of farm buildings, taps, and other metallic objects in contact with the wiring system.

The Earthing of Apparatus

With a simple bare neutral wiring system, *not concentric*, the earthing of appliance casings could be carried out with an independent earthing conductor and electrode, but the economy of such an arrangement is doubtful. Either the appliance earth wire would have to be insulated or run entirely separate from the bare neutral wire if the neutral potentials were not to reach it. It would appear to be a much simpler way to insulate the neutral wire and utilise the conduit or other metallic sheath to earth the appliance casings, as by this step we also keep the conduit system clear of potentials on the neutral. This brings us back to our present method of using two insulated wires for all circuits, and treating the neutral wire as a live wire, which it often is.

Nobody, I imagine, will quarrel with the proposal to adopt multiple earthing in this country, as by this means single-pole accessories can be employed throughout an installation with advantage in economy and reliability, but even with wiring systems employing insulated neutral wires at least two distinct earth connections may be needed, one for the neutral and one for the internal installation; these must be widely spaced to prevent one coming within the area of any potential gradient that may be set up by the other. Often *three* separate earth connections would be necessary, one for the neutral, one for the metallic sheathing of the internal wiring system, and the third for the earthing of appliance casings, &c.

The immediate object of this article is to find some reason for the continued and authoritative advocacy of bare neutral wiring, to learn its advantages (if any), and to obtain an explanation of how this system is likely to benefit either the consumer or the industry in this country, in view of an entirely different experience abroad.

A Subterranean Power Station

The new plant of the Societe des Forces Motrices de la Truyere

WORK is rapidly approaching completion on a new hydro-electric installation of the Société des Forces Motrices de la Truyère, of Paris, which, when completed, will, it is claimed, be the largest undertaking of the kind in France. The scheme will provide in Southern France a large electric power production centre which will be interconnected with various supply undertakings in Northern, Southern, and Eastern France.

Two generating stations are being established at the outset at Brommat and at Sarrans, that at Brommat being intended to use water at the rate of 18,490 gals. per sec. The Sarrans station is intended to meet peak-load demands, and will be capable of supplying 120,000 kVA when working under a head of 420 ft.

The water used for the turbines at Sarrans will be collected 1¼ miles below the station in the Cadene reservoir, which has a useful storage capacity of 132 million gals., and from which the water will pass to a further reservoir at Bromme capable of storing from 37,400 to 44,000 million gals.

The two reservoirs are connected by a cement-lined tunnel about 4.8 miles in length cut through solid granite, its diameter being about 19 ft. 9 in. From the Bromme reservoir the water will again pass through a tunnel 23 ft. 9 in. in diameter and just over a mile in length into two directly vertical pressure pipes, also bored through the rocks to the subterranean power station at Brommat.

Entirely Underground

The Brommat generating plant will form the main section of the undertaking and will be capable of developing 195,000 kVA during eight hours of each day. One of its outstanding features is that it is entirely underground, it being situated in an opening bored out of the solid rock. The subterranean machine room necessitated the excavation in solid granite of a space measuring approximately 246 ft. in length, 72 ft. in width, and 95 ft. in height. Its position also made it necessary to construct a special ventilating shaft and an inclined tunnel to the surface. Special provision against accident due to flooding has also been made.

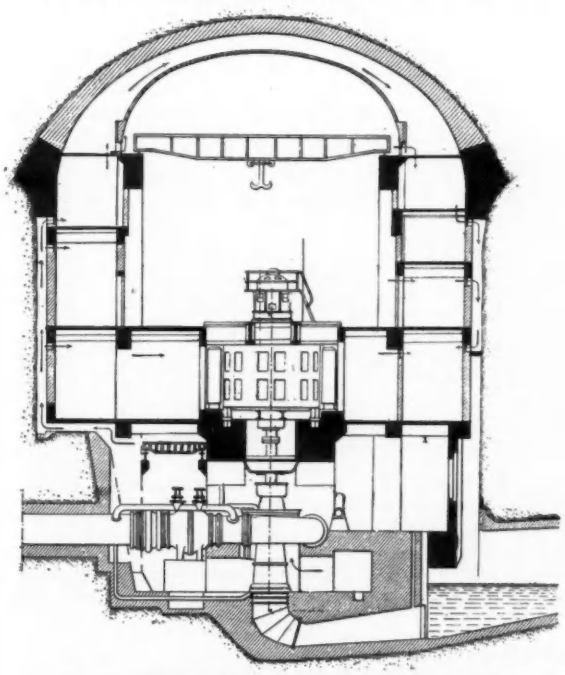
At Brommat there are six main 29,250-kW vertical-shaft turbines and alternators for working under a net head of from 787 to 840 ft. at 500 r.p.m. and 15,000 V. A 1,500-h.p. horizontal-shaft 5,500-V set to run at 750 r.p.m. has also been provided for station auxiliary supplies, while there is also a battery of accumulators of 1,000-Ah capacity for emergency d.c. supply.

The six Francis turbines have been constructed by two concerns, J. M. Voith, of Heidenheim, and the Ateliers Neyret-Beylier et Piccard-Pictat, and are each designed to develop 39,000 h.p. under a head of 787 ft. and 42,500 h.p. under 840 ft. with efficiencies under full load of, respectively, 87 and 86.5 per cent. The discharge channel from the turbines is about 1,128 yards long. The alternators have been built by the Alsthom and A.E.C. concerns, weigh 190 tons, and have rotors 23 ft. in length and 9 ft. 9 in. in diameter over the poles, while the outside diameter of the stators is 21 ft. 4 in.

The access tunnel to the generating station is 328 yards in length and has a slope of 60 per cent. It is provided with a rail track on which runs a trolley capable of carrying loads

The buildings and transforming station at the outlet from the Brommat station

up to 65 tons. Working on the same track is a 5-ton inclined lift for the conveyance of the staff and light materials. Along the walls of this large tunnel are carried the light cables used for signalling and metering purposes.



A cross section of the underground power station

Arrangement of Cables

The main outgoing power cables are laid in the lower section of the tunnel, so that it has been possible to arrange the 15,000-V cables, including an emergency set, on each side of the central gangway.

The generating pressure of 15,000 V was decided upon owing to the distance between the alternators and the transformers, the latter being situated about 370 yards from the tunnel outlet. Each generating set is separately connected to its own transformer in order to obviate the use of switch control gear of very high power. The cables are each designed to transmit 30,000 kW for from eight to ten hours and are of the triple-conductor equipotential type with a total sectional area of 240 sq. mm. The conductors are copper, paper insulated, with a lead sheath covered by strips of brass. The whole is stranded and enclosed in jute and a double layer of wire-bound sheet steel.

The power generated at Sarrens and Brommat will be stepped up at adjacent transforming stations, partly to 220,000 V for transmission to Eguzon, Orleans, Paris, Saumur, Angers, Monistrol, St. Etienne, and Lyons; and partly at 150,000 V for Baggnol, Marseilles, Clermont-Ferrand, Montlucon, and other places.

The Brommat outdoor transforming station, which is situated at Le Brezou near the exit of the inclined tunnel, comprises six 32,500-kVA 15,000/220,000-V transformers; one 15,000/150,000-V set, which can be connected to one of the main generator sets; and a spare transformer adapted to step up to either 150,000 or 220,000 V in order to act as a standby to any of the seven other transformers. All the units are of the air-cooled, three-phase, neutral-point insulated type.

The plant at the Sarrans station will comprise three main 40,000-kVA Francis-type vertical-shaft turbines and generators running at 214 r.p.m. and producing power at 15,000 V. For auxiliary purposes a 3,500-h.p., 5,500-V set will also be provided. The transforming plant at Sarrans will comprise three 40,000-kVA 15/220-kV transformers.

Work on the scheme was commenced before the war, but was suspended, the actual constructional operations not being recommenced until 1928. It is expected that the Brommat plant will be ready to commence operation shortly and will be followed by the Sarrans plant early in 1935, when the total capacity of the installation will amount to 315,000 kVA.

We are indebted to the Truyère Co. and the *Revue Générale d'Electricité* for the accompanying illustrations.

Starting Glass-bulb Rectifiers. By J. L. North, Grad.I.Mech.E.

THE increasing interest which is being shown in the use of mercury-arc rectifiers accentuates the fact that the available literature upon this important branch of heavy electrical engineering is limited, and is concerned mostly with foreign practice.

Contrary to American and Continental ideas, the number of sub-stations in the British Isles in which glass-bulb rectifiers are installed greatly exceeds the number equipped with the metal-clad type. But books contain little or no data regarding the starting and auxiliary arc-maintaining methods employed with glass-bulb rectifiers. With either type the cathode spot in the rectifier vessel must be maintained while the set is on load and when it is idling. This is effected by means of auxiliary anodes energised at low voltage (generally 60 V between phase and neutral), through choke coils which limit the current. This forms a simple single-phase rectifier (fig. 1).

The main transformer is fitted with an auxiliary secondary winding which energises the maintaining circuits, and primary ignition is effected in the glass bulb by the following methods. Closing the a.c. switch excites the transformer and current flows in the secondary winding to the starting coil SC, via the relay contacts, and thence to the neutral point of the transformer. The starting coil is mounted externally on an arm of the bulb immediately beneath a light flexible starting electrode S inside. This is drawn into the mercury, short-circuiting the coil. The arm is released, thus causing a small arc to form, which is picked up by the auxiliary anodes. Unidirectional current will then flow to the cathode, energising the d.c. relay and opening the contact P.

Another method employed is an adaptation of the well-known pinch effect (British Patent No. 4361/32). A small transformer IT (fig. 2) supplies a large current at 2 V between the cathode and through a narrow neck of mercury M to the electrode S.

This arrangement sets up a magnetic field and the resultant of the forces of mutual repulsion in the atomic structure of the mercury becomes greater than the hydrostatic pressure. The mercury tends to part, increasing the current density, which in turn augments the forces of repulsion; finally rupture occurs, producing an arc, and the mercury then resumes its original level. Current immediately flows in the auxiliary anode circuits, opens the relay R, and disconnects the ignition transformer from the circuit.

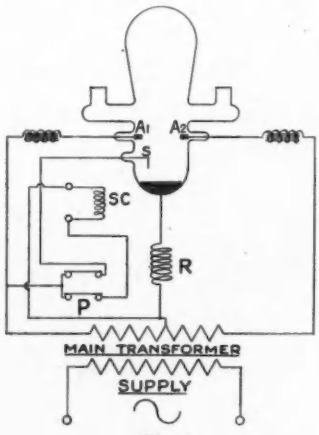


Fig. 1

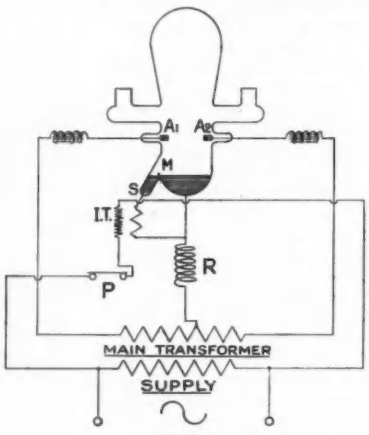
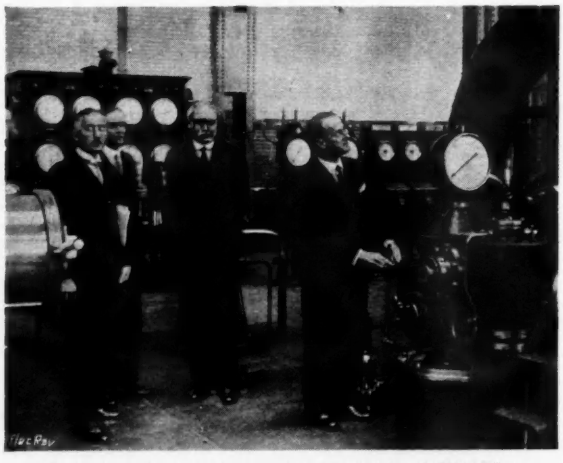


Fig. 2

Ironbridge Opened

IN our issue of September 2nd, we published technical particulars of the Ironbridge power station of the West Midlands Joint Electricity Authority. The station was formally inaugurated on October 13th by Mr. P. J. Pybus, Minister of Transport. Alderman John Bell, the chairman of the Authority, presided, and amongst those present were Sir Andrew Duncan (chairman, C.E.B.), Sir John Snell (chairman, Electricity Commission), Sir John Brooke (vice-chairman, Electricity Commission), Sir Henry Haward, Sir Archibald Page (chief engineer and manager, C.E.B.), Sir Percival Bower, Mr. R. T. G. French (secretary, Electricity Commission), Colonel J. Baldwin-Webb, M.P., and Mr. Alexander Ramsay, M.P.

Proposing the toast of "The Electricity Industry" at the luncheon, Mr. Pybus observed that many home industries had admitted that, in some technical particular or another or in marketing, they had fallen behind foreign competitors. The electrical industry, however, had taken full advantage of the bad times to reduce the cost of production and to increase efficiency, and—particularly in the heavier classes of generating and conversion plant—it had little to learn from competitors overseas. Ironbridge station was estimated to produce electricity at ¼d. per kWh, including all capital charges. He commended the wise and far-seeing co-operation of its owners.


Mr. P. J. Pybus starting up the Ironbridge 50,000-kW set

The best advertisement for business abroad was a highly efficient and economical example at home, and it was of the utmost importance that as frequently as possible great plants should be erected in this country in which the whole range of research and new invention was incorporated. The electrical industry would be the first to recognise that its prosperity was in large measure due to good fortune, for the world depression had caught the electrical industry in Great Britain at a time when a rapid expansion was taking place. The industry was bound to make special efforts to see that all its consumers obtained the fullest advantage.

Responding and proposing the toast of "The West Midlands Joint Electricity Authority," Sir Andrew Duncan stated that the Central Electricity Board was now within measurable distance of the completion of the national system. The existence of the West Midlands Authority (constituted in 1925 on its members' own initiative, to do for the supply industry undertakings within their jurisdiction what later the Central Board was set up to do nationally) was a reminder that the principles underlying the 1926 Act had already approved themselves to the judgment of the electricity supply industry.

The concentration of the production of electricity in selected stations strategically placed throughout the country and its transmission by means of a national network to practically every part of the country would permit of growth on an ordered plan, and would relieve the electricity supply industry of the limitations from which it suffered in so many parts of the country under the old system of local generation.

The "Parish Pump" Scrapped

Proposing "The Guests," and responding, Alderman John Bell, the chairman of the Authority, said that the electricity undertakings in the district had pooled their generation resources under a rationalised control, and bought their supplies from the co-operative authority on a common multi-part tariff, which was designed so that each constituent undertaking obtained its share of the benefits of joint working. Very marked reductions in the costs had resulted, and consequently in the average prices of bulk supplies, and the vendors of the stations were satisfied that the Authority had fully justified itself, in that they were purchasing supplies at a cost considerably below that which would have been incurred had they individually retained control of their stations.

The station contained an initial set of 50,000-kW capacity and would be capable of extension to 200,000 kW. The work now completed represented a capital expenditure of just under £1,000,000, or about £20 per kW. When the station was fully completed the cost would only be about £14 per kW. Mr. Hetherington, chief engineer and manager to the Authority, had been entirely responsible for the design and construction from start to finish. As a result of the advice of Mr. Ivan Daughtry, the advisory architect, the station would rank with the finest industrial buildings of the world.

Mr. Alexander Ramsay, M.P., declared that the chain of stations erected by the Central Board was the only constructive effort connected with the producing trades carried on by the Government since the war.

MEETINGS AND DISCUSSIONS

Current Topics and Opinions Expressed at the Institutions

Brightening British Hotels

ALTHOUGH the E.D.A.-E.L.M.A. Hotel Lighting Campaign has actually been started, a good purpose was served in allocating the first of the London Salesmanship Conferences of the BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION this session to an explanation of the scheme and the part which the various branches of the industry are expected to play in it, E.D.A. and E.L.M.A. having done the preliminary work, and afterwards standing by to give all possible assistance in every direction. The campaign continues until the end of next month. Mr. A. C. Cramb, director and secretary of E.D.A., presided.

As explained by Mr. V. W. Dale (the business manager of E.D.A.), the campaign is a nationally organised effort for the recruitment of all sections of the industry in the work of raising the standard of hotel lighting. It needs no stretch of the imagination to visualise the amount of business waiting to be done in the 9,000 hotels in this country and the allocation of £4,000 jointly by E.D.A. and E.L.M.A. for the initiation of such a campaign is evidence of the importance with which it is viewed by the organisations responsible for increasing the sales of electricity, lamps, fittings, installation work, &c.

Survey Revelations

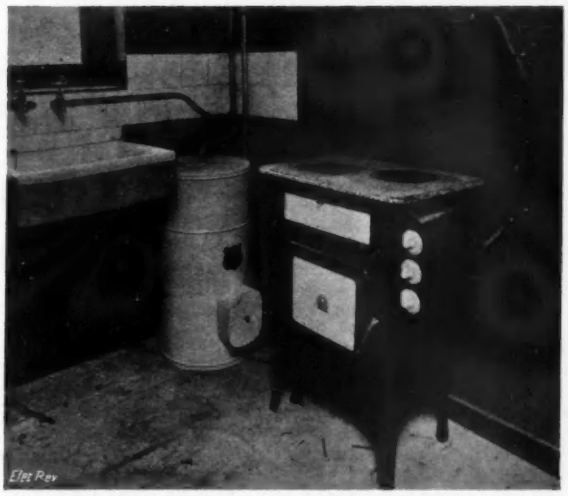
Mr. Dale stated that a recent survey revealed that in more than half the hotel bedrooms in this country it is not possible to control any of the lighting in the room from the bed; that nine out of ten bedrooms lack bed-head lights; that in nearly half the bedrooms no lighting is provided for the mirror or dressing table; that two hotels out of three have no lighted sign on the exterior; that 83 per cent. of them have no floor or table standards in the lounge; and that nine out of ten have no illuminated signs in the corridors.

The campaign consists, in the first place, of direct mail publicity on the part of E.D.A. to all hotels throughout the country, followed by active work on the part of the Circles or, where no Circle exists, by a Development Committee organised by the local supply authority. Forms have been prepared for reports to be made in every area on the conditions in all hotels with suggestions for modernising and improving the installations, and the E.D.A. has appointed Mr. Evans to take charge in London and to be available on all occasions for advice and assistance, in addition to the E.D.A. Area Officers. Special "literature" is being distributed to the trade in connection with the campaign, and contractors and others are urged to get into touch immediately with their E.D.A. Area Officers.

Mr. W. J. Jones (E.L.M.A.) then showed a large number of lantern slides relating to modern hotel lighting installations, and gave reasons why hotel proprietors should incur expenditure in modernising their installations. The Hotel Proprietors' Association, at a meeting at Edinburgh recently, gave the matter consideration, and arrangements have been made with the Hotel Proprietors' Associations in Torquay, Glasgow, Manchester, and Bridlington for lectures to be given by speakers from headquarters.

It was suggested that when anybody connected with the electrical industry stayed at, or knew of, a hotel which was badly lighted he should draw the attention of the manager to the fact or communicate with the E.D.A., or the local Circle.

The question of contractors *versus* municipal authorities in the matter of installation work was raised by a representative from Hastings, but the chairman said he was not going to be drawn into a discussion on that subject. The work of E.D.A. was to sell as much electricity as possible, and to secure the closest co-operation between every branch of the industry.



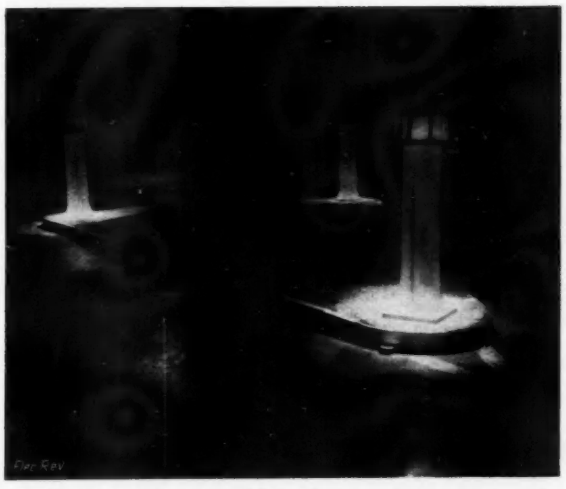
The kitchen of one of the working-class flats described on page 618

Mr. Dale mentioned that contact was being made from headquarters with the brewery companies interested in hotels. The chairman added that E.D.A. was also carrying out a small campaign for electric heating in bedrooms, which might be borne in mind in connection with the lighting campaign.

The next Salesmanship Conference will deal with the subject of electric cooking.

Is Unbridled Competition Desirable?

SOME aspects of the electrical industry in relation to Great Britain's economic position are the subject of the inaugural address which Mr. A. Cecil Livesey delivered on October 17th as chairman of the Mersey and North Wales Centre of the INSTITUTION OF ELECTRICAL ENGINEERS.



"Pillar-of-Fire" guard posts for the guidance of traffic (See page 618)

Britain's prosperity depends on her exports, and in future the electrical industry must make an increasingly important contribution towards her well-being. Some economists have been accustomed to regard the consumption of electricity as one of the indicators by which to judge the economic progress and prosperity of the country, but experience of the past two or three years has proved this "barometer of industry" to be misleading.

The competitive efficiency of the industry, not as between firm and firm, but as a whole *vis-à-vis* its competitors in the world's markets, needs to be improved. But individualism, which is ingrained in the British character, has had a retarding influence. It is a valuable asset in many respects, but is also a virtue which carries the defects of inadaptability and reluctance to co-operate.

Research and Development

For instance, the Electrical Research Association is, comparatively, little appreciated outside the sphere of its contributory members and supporters; it might almost be accused of "hiding its light under a bushel." Measured by comparison with the productive capacity and resources of the industry, the scope and opportunity of the E.R.A. are limited. It should have more support, so that its sphere of usefulness could be made of the widest possible application.

Extension of its activities and equipment would not entail too great a cost, because, if shared by the whole industry, it would not represent more than a reasonable charge on any section or firm. Research will assume much greater importance in future; it must become one of the main corner stones in the structure of industry.

These views are not new, but their importance justifies reiteration. If the E.R.A. had facilities, including properly equipped workshops, for making up experimental apparatus

practical developments could be profitably pursued in many directions. Progress would be assisted generally if opposing claims could be investigated and determined, and correct forms developed, by some central independent authority whose findings and recommendations would not only be acceptable to, but accepted by, all manufacturers and users alike.

Another function which the E.R.A. might exercise with advantage is the carrying out of standardised type tests on products of any manufacturers who cared to submit their apparatus for such tests. The results could be recorded and certificates issued, which would have a recognised status and be available to anyone (on payment of a fee), including competing manufacturers. Such a service would provide a healthy stimulus to improvement.

Manufacturing Tendencies

Our general competitive efficiency has also been weakened by certain tendencies on the manufacturing side. For example, that of an increasing number of firms to embark upon the manufacture of an ever-widening variety of machinery and apparatus, so that many of them are now making more varieties than they can profitably find a market for.

Even in times of full industrial activity few of these firms could possibly have sufficient turnover or manufacturing capacity in any one line to enable it to be produced really efficiently and economically. The domestic appliance market is somewhat different, though there is probably room here, too, for some measure of rational co-operation among manufacturers. The prevalent notion that intensified competition brought about by multiplicity of manufacturers is good is mistaken and no longer tenable in the hard realities of world conditions to-day.

The theory of the survival of the fittest is a very dangerous one, for it might mean the survival of the financially fittest and result in the progressive lowering of the standard of quality. Surely it is not beyond the wit of our people to develop means of securing rationalisation, without certain of its attendant disadvantages, possibly assisted by some form of financial interlinking, so devised as to preserve the separate entity of each firm and at the same time secure wholehearted co-operation.

The industry generally is not organised to make its trading activities abroad fully effective. Individualism and excessive competition are again much in evidence, whereas modern world conditions demand unified and co-ordinated effort in the disposal of goods in foreign markets. Joint representation, distribution and marketing will accomplish that which individual effort cannot attempt. A change of outlook is necessary if solid success is to be achieved.

More Light in the Home

THE presidential address of Lieut.-Com. Haydn T. Harrison to the ILLUMINATING ENGINEERING SOCIETY in London on October 11th was largely a historical record of public street lighting. Luckiesh described illuminating engineers as those who should be proficient in the "science of seeing." This is indeed the main object, but the president points out that a further one which must not be overlooked is that of producing brightness. How often does one read about any means for brightening the homes of those who have little choice in these matters? Nobody knows better than an illuminating engineer the effect of bright surroundings on the lives of those who must needs live a somewhat dreary and monotonous existence because their work is becoming more mechanical and less interesting every year. The majority of such people return every day to houses built on a standardised plan, which in the many dark months of the year are even more monotonous than their work and the workshops or offices in which they do it.

Electricity undertakings are now providing showrooms where there is a choice for certain classes of people. But in many places the only stock, and often the best selection, of shades is at Woolworth's, at the modest price of sixpence each. There is no objection to this, nor to the fact that the people are taken by the bright colours and shapes of such shades, which are designed to catch the eye, but, it should be remembered that in many cases, when they are not even lined with a reflecting surface, they do not in any way direct the light, but only absorb it and thus reduce the illumination. It is true that light energy is cheap, but not so cheap that the class referred to can afford to use it indiscriminately at all times in their homes.

Manufacturers should produce and the retailers exhibit in their windows, and sell from stock over their counters at a price within the means of these people, attractive and efficient shades and reflectors which may not last for ever but will add to the brightness of these millions of homes, and of the places in which the people work.

That such appliances do not last for ever might prove a good feature, as they would then be periodically changed and the brightness renewed, the periodic cleaning of the more permanent type being often overlooked. "Increasing your illumination" are words not understood by everybody, and need not necessarily mean increased brightness, but in order to render the plan successful their meaning must be made very obvious to all observers.

The same applies to the streets; the public must be led to help themselves, instead of acting as obstructionists, as at present they often do.

No Radical Advance in Illumination

THE third annual report on progress in illumination prepared by a technical committee of the ILLUMINATING ENGINEERING SOCIETY was considered at a meeting in London on October 11th.

No radical advance is recorded. Gas lighting continues to develop; the use of pearl and opal electric lamps (which reduce glare) in preference to clear bulbs is increasing, and their makers have concentrated on securing greater consistency of performance. British Standard Specification No. 161 for tungsten-filament electric lamps has been revived, certain dimensions having been changed to conform to international standards.

The introduction of new tubular lamps with filaments running up to the ends has rendered "gapless" lines of light a possibility. A vapour lamp development of considerable interest is the hot-cathode discharge tube, 400 W being consumed in a column of vapour about 6 in. long, which is operated directly on a 230-V supply. It is estimated that three times the efficiency attainable from ordinary lamps can thus be obtained, and lamps based on this principle will find applications for exterior lighting, and in other cases where the colour of the light is not regarded as a serious drawback.

Accessories and Equipment

Developments in lighting accessories and equipment have not been numerous or of outstanding importance. British manufacturers now supply either solid or cased opal glass with low light absorptions and good diffusing powers; a new type of mottled or "flake" opal is also being produced.

In street lighting the standard of maintenance has improved. Lamps of 150 W and upwards are more widely used, and 100 W tends to become the minimum size of lamp for use in public illumination schemes.

Railway and Industrial Lighting

The most important development on railways has been the floodlighting of shunting yards. For one railway fifteen new schemes of lighting by projectors have been put forward, and a 60-projector installation is being prepared for Swansea. On the Underground railways of London the feature has been the adoption of "architectural" illumination, the main object being to improve the appearance of booking halls and platforms, and make them cheerful and inviting.

Statistical investigations conducted by one of H.M. Inspectors of Factories confirm the impression that in some areas the progress made since the compilation of a similar series of data, about twenty years ago, is disappointing. Thus, in more than 200 factories visited in the ironfounding, light engineering, and textile industries, few really satisfactory installations were found. Glare was prevalent, and more than half of the readings only attained 1.5 foot-candles or less, only 11 per cent. attaining 5 foot-candles or more. In newly erected factories conditions are usually much better, and some admirable installations are being made.

There has been no pause in the development of floodlighting. In a great many cases, in all parts of the country, newly erected buildings have been equipped at the outset with floodlighting installations.

A Record of Progress

MODERN electrical developments was the subject of the inaugural address which was delivered by Mr. G. F. Sills, chairman of the North-Western Centre of the INSTITUTION OF ELECTRICAL ENGINEERS, in Manchester, on October 18th.

Mr. Sills considers one of the most important developments to be the incorporation of a control grid in front of each anode of mercury-arc rectifiers, which gives them characteristics almost similar to those of three-electrode thermionic valves.

The accurate recording of time electrically is being developed rapidly. The type of motor which operates a.c. frequency controlled clocks can be used for synchronising television apparatus, and could also be made to function as a time switch, for example, to obtain maximum demand indications on a number of meters exactly at the same time. An interesting

double-tariff prepayment kWh meter has a relay which makes the change-over from a high tariff at low load to a low tariff at high load.

All the main distributing transformer sub-stations of the Manchester Corporation are arranged for automatic voltage control.

By the end of 1934 not less than 333,000 h.p. of water power will have been developed in the British Isles, of which 275,000 h.p. will be in Scotland, excluding numerous small units. Including Ireland, 749,000 h.p. could be economically developed.

Outdoor sub-stations are growing in number, and abroad even the buildings which usually house the generators have been dispensed with. In the United States a 50,000-kVA hydrogen cooled synchronous condenser has been installed out of doors. On paper, hydrogen cooling seems to be an economic method for steam turbo sets of 40,000 kW and upwards.

Oil-filled cable is in service, including three-core types for medium voltages, and sixteen miles of 220-kV cable with condenser type joints has been manufactured for use on the Continent.

High-capacity Switchgear

There is now 132,000-V metal-clad gear of 2½-million kVA rupturing capacity, using oil filled cable for buses and interconnections. One wonders, however, how oil-filled cable, when used in this manner, will stand up to short circuits of the order just referred to. Oil switches for 160,000 V have been made and sent out from this country, and a 3-million kVA rupturing capacity circuit breaker has been put into service on a 220,000-V system.

A complete control and metering board for a 200,000-kW station, comprising five generators, five transformers, and four outgoing transmission lines, with all attendant switching and synchronising facilities, totalling ninety-four controllers, can be placed in a space 12 ft. long by 3.5 ft. wide. In at least one of the large highly industrialised countries fuses show signs of disappearing in favour of small automatic breakers. Even in this country a beginning has been made, tiny circuit breakers taking the place of wired fuses in houses.

Rolling-mill Equipment

For electrical dust deposition, machines have been made in this country (for the first time, it is believed) to generate 40,000 V. The first large rolling mill has just been put into service in this country in which each of the two d.c. 2,000-h.p. motors is used to drive one main roll, thus omitting heavy pinions and their housings. Three important equipments in America are similarly arranged. The electromagnetic preheating of rolls inductively is a practical advance that obviates expansion stresses which start cracks.

Individually driven live roller gear, as distinct from the main rolls, is now just coming into use in this country, although it has been used abroad for some time; this eliminates bevel and spur gearing and controls the motors individually or in groups.

Heat treatment furnaces of the double-deck type up to 28 ft. in length have recently been constructed, and a furnace 115 ft. long has recently been installed for baking the decoration on pottery. An adaptation of the electric furnace is being incorporated in boiling pots for the manufacture of plaster. In view of the fact that the power consumption is 240 kW per boiling pot, this is very acceptable to the supply industry.

Successful experiments have shown the possibilities of utilising electricity for the withering and drying of tea, and the proposed erection of a large hydro-electric station to supply power for this purpose shows the importance of this scheme.

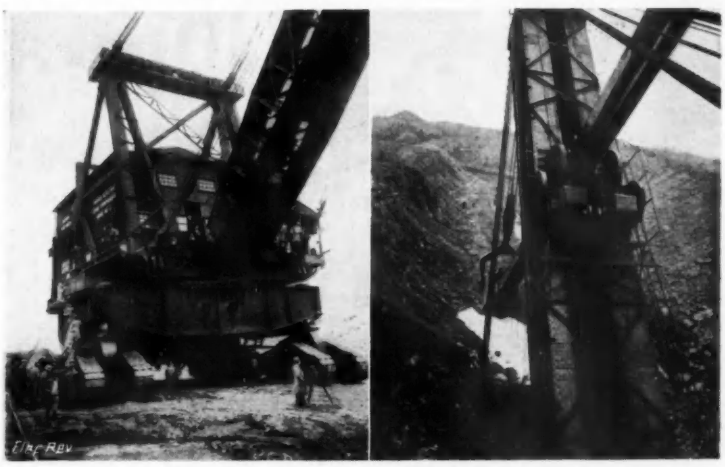
Why Safety Regulations are Essential

THE presidential address which Mr. G. Scott Ram delivered to the Association of Supervising Electrical Engineers in London on October 18th dealt with the evolution of design and layout of electrical apparatus from the point of view of the safety of attendants and users, and put forward some "horrible examples."

Extraordinary lack of foresight often characterised early designs and layouts. When accidents occur those directly concerned usually take steps to prevent a repetition, but similar conditions may obtain elsewhere, as the lesson to be learnt from a particular class of accident does not become generally known.

It is the frequency with which dangerous conditions are liable to be reproduced in different places that has brought about the introduction of regulations under the Factory Acts. Some of the risks seem so obvious as to imply that regulations are not necessary, yet every year accidents (often fatal) occur through their non-observance, in spite of the publicity given to prosecutions which are often followed by heavy penalties.

The inevitable result of increasing the power behind a switchboard is well known, yet the process continues and is causing much trouble and anxiety, even where comparatively modern switchgear is used. Small but ill-considered details of design sometimes provide deadly traps, and indicate that the draughtsman has no personal practical experience of the working of the plant; he fails to visualise matters from the point of view of the actual user.



Two views of what is claimed to be the largest electrical excavating machine in the world. This has a 120-ft. boom and a 15-cu. yd. grab, and is in use at an Illinois mine

Some consulting engineers, even, are not free from the shortcomings of other engineers; and, while supply undertakings are supposed to be responsible for the safety of their portion of the apparatus installed in consumers' premises, Mr. Scott Ram cites instances of amazing lack of the sense of responsibility for the safety of unskilled persons employed in close proximity to such unprotected gear. An important matter, constituting a real danger of serious accidents to householders, is the continued use of undesirable types of fuse boards and holders, plugs and sockets, portable handlamps, and other similar accessories.

Many accidents and burns to users' hands have been caused by these things, their severity depending upon the size of the fuse in the circuit, which is usually much larger than need be. Some plugs and other devices are fitted with hand shields, but in the constant endeavour to cheapen their goods manufacturers in some instances have spoiled the result by cutting down the shield to such an extent that it is hardly large enough to be called a shield at all.

The Technics of Plastic Moulding

At a meeting held on October 12th, in London, the new Plastics Group of the Society of Chemical Industry was formally inaugurated under the chairmanship of Mr. H. V. Potter, B.Sc., F.I.C. Its membership comprises those concerned with the technical aspects of the plastic moulding industry, the products of which are finding ever-increasing use in the electrical world, for insulation purposes, decorative fittings, accumulator cases, wireless accessories, &c. Mr. Potter, in an address to the meeting, surveyed the field of plastic materials of organic origin, and more particularly the synthetic organic products, which have developed comparatively recently, beginning with celluloid and passing on to other cellulose esters, viscose, casein, and synthetic resinoid products. There were no figures available, he said, regarding the value of the turnover of the industry, but it was reasonable to assume that, including the gramophone-record industry, it represented about 10 or 15 million pounds and about 25,000 tons weight produced per annum. Its possibilities were extensive. Plastics had in many cases been adapted to meet existing conditions where they could. The future would depend on designs being built round the special properties of plastics.

* * *

The Radiographic Examination of Welds

X-rays promise to be of considerable value as a non-destructive means of examining welded metal. The methods employed are discussed in some detail in the paper which Mr. R. A. Stephen read before the Institution of Welding Engineers in London on October 19th. X-ray equipment for this purpose of Philips manufacture is now obtainable in a compact mobile form which is shockproof and easy and safe to handle in a factory. Allied to the research work carried out by the present means of metallurgical attack, X-rays can also be used to regulate the best operating conditions of the welding current, to investigate the action of slag coatings, and to determine the correct rate of feed. It seems, too, that automatic or semi-automatic welding machines will be adopted for a large class of work.

Electricity at Olympia

Displays of electrical equipment for motor cars and garages

THE component and accessory section of the annual Motor Exhibition at Olympia, which closes to-morrow (Saturday) imparts some idea of the large amount of work which the motor industry is giving the electrical industry.

To-day all cars embody generators, batteries, starting motors, and lamps of all kinds, not to mention the ignition equipment and other current-using appliances. In motor garages, service stations, and repair shops, too, the number of electrically driven appliances has grown to such an extent as to necessitate a special section at Olympia.

In view of the trend on the part of motor car manufacturers to equip their vehicles with battery and coil ignition in place of the once universal magneto, most of the manufacturers of the latter, while continuing these for commercial vehicles and motor cycles, have now added battery ignition sets to their range of productions. Among the concerns displaying equipment of this kind are the British Thomson-Houston Co., Ltd., among whose specialities is a combined coil and magneto outfit; Delco-Remy & Hyatt, Ltd.; La Fabbrica Italiana Magneti Marelli; North & Sons, Ltd.; A. Rist (1927), Ltd.; Rotax, Ltd.; Simms Motor Units, Ltd.; and Scintilla, Ltd., who show a new form of magneto designed to be mounted in place of coil ignition sets, and a new flickering-light direction indicator. Some interesting instruments for testing the armature windings of dynamos, motors, and magnetos are displayed by the Autocar Electrical Equipment Co., Ltd., J. A. Riley, Newtons of Taunton, Ltd., and Fredk. J. Gordon & Co., Ltd.

A number of firms exhibit sparking plugs of various patterns, and wire and cables for ignition and electric lighting equipment are shown by E. Kalker & Co., Remax, Ltd., Ripaults, Ltd., the Palmer Tyre Co. (Silvertown), Henley's Tyre & Rubber Co., Ltd., Pirelli, Ltd., and Delco-Remy & Hyatt, Ltd. (B.I.), some of the firms supplying the flex wound on convenient spools. The Ioco Rubber & Waterproofing Co., Ltd., also shows at its stand samples of insulating tape and "Linapex" varnished insulating cloths.

Facia lighting on Messrs. Wakefield's stand

Batteries and Charging Apparatus

Several stands are occupied by makers of accumulators for use on motor vehicles, among the manufacturers represented at the Show being Britannia Batteries, Ltd. ("Pertrix"), the Chloride Electrical Storage Co., Ltd. ("Exide"), the Fuller Accumulator Co., Ltd., the Lucas Electrical Co., Ltd., which also displays the "Startix" automatic solenoid engine starter, a device for the automatic starting of engines when they are accidentally stopped when driving in traffic, &c., the National Accumulator Co., Ltd. ("Dagenite"), Oldham & Son, Ltd., the Tungstone Accumulator Co., Ltd., C. A. Vandervell & Co., Ltd., Rotax, Ltd., and the Young Accumulator Co., Ltd. Some useful battery charging sets and equipment for the repair of accumulators, dynamos, and other automobile electrical components are shown by a number of firms, including the Autocar Electrical Equipment Co., Ltd., Fredk. J. Gordon & Co., Ltd., Newtons of Taunton, Ltd., Partridge, Wilson & Co., Ltd., and the Westinghouse Brake & Saxby Signal Co., Ltd. J. W. Pickavant & Co., Ltd., show, in addition to battery repairing tools, a special magneto testing apparatus known as the "Quikko."

At the stand of S. Guiterman & Co., Ltd., is displayed a new instrument known as the "Find-A-Leak" battery tester, by means of which it is claimed that a complete 12-V battery can be thoroughly tested for inter-cell leakage in five minutes. A truck specially designed for the handling of accumulators in repair departments is to be seen at the stand of Mann Egerton & Co., Ltd. C.A.V.-Bosch, Ltd., confines its display to equipment for motor boats, among the appliances on view being dynamos and starting motors for marine engines, accumulators, and external and interior lighting fittings. At the stand of the Benjamin Electric, Ltd., are to be seen special fittings for the flood lighting and general illumination of petrol filling stations and garages. Among miscellaneous goods may be mentioned the electric clocks for car use of S. Smith & Sons, Ltd., the electric horns and sirens of Klaxon, Ltd., and the terminals of Ross, Courtney & Co., Ltd. In the motor boat section, Stuart Turner, Ltd., show a range of compact 250-, 500- and 1,500-W combined petrol engines and dynamos, complete with switchboards, for yacht-lighting purposes.

Tools and Garage Equipment

Fixed and portable electric tools are shown on a number of stands, including those of the Arrell Manufacturing Co., Ltd., E. P. Barrus, Ltd., Black & Decker, Ltd., V. L. Churchill & Co., Ltd., Grimston Electric Tools, Ltd., George Hatch, Ltd., A. A. Jones & Shipman, Ltd., Micox Electrical Equipment Co., the Laycock Engineering Co., Ltd., Newtons of Taunton, Ltd., and Morris & Ingram, the last named also displaying the "Larmar" sparking plug testing device.

Another class of exhibit in this section of the Show consists of electrically operated air compressors for tyre inflation and car washing purposes, among the makers represented being B.E.N. Patents, Ltd., Bristol Pneumatic Tools, Ltd., Brown Bros., Ltd., R. H. Cook and Co., Ltd., Harvey Frost & Co., Ltd., Fredk. J. Gordon & Co., Ltd., Leo Air Compressors, Ltd., Mann Egerton & Co., Ltd., Rotax Motor Accessories, Ltd., Simpkins' Engineering Works, Tangyes, Ltd., William Turner & Son, Ltd., and Williams & James. Tecalemit, Ltd., shows an "Electrogun," an electrically driven machine for forcing lubricant into spring shackles and other chassis components.

Electrically operated mechanism is also now being used in connection with petrol pumps, and examples of this are being shown by Avery-Hardoll, Ltd., S. F. Bowser & Co., Beck & Co., Ltd., the Ferolite Engineering Co., Ltd., Liquid Measurements, Ltd., Theo & Co., Ltd., and the Wayne Tank & Pump Co., Ltd. The British Thomson-Houston Co., Ltd., is now manufacturing a range of flameproof a.c. and d.c. motors for use in petrol pumps. Both types have a continuous rating of ¾ h.p., and at present are supplied only for vertical mounting; motors for horizontal fixing are, however, in course of development.

A useful device for winter use in service stations is the electric oil decongealer of Theo & Co., Ltd., for warming lubricating oil in drums and tanks in cold weather. Finally, reference may be made to the electrically operated machines for the testing of the brakes of cars shown by Bendix-Perrot Brakes, Ltd., and Harvey Frost & Co., Ltd.

The accompanying picture is a view of the stand of Messrs. C. C. Wakefield & Co., Ltd., at the Motor Show. The illumination is seen to be most effective; 112 60-W gasfilled lamps were concealed inside the facia and in the recesses at each side of the stand. The installation was carried out by Messrs. W. C. Tackley, electrical engineers, of 28, Blythe Road, W.14.

The Trevithick Centenary

A meeting of representatives of engineering institutions was held yesterday, October 20th, at 5.30 p.m., at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1, to consider a proposal to mark in an appropriate manner the centenary, in April next year, of the death of Richard Trevithick, one of the greatest of our engineers. Engineers interested in the proposal are invited to keep in touch with the movement, which was started by the Newcomen Society for the Study of the History of Engineering and Technology, the hon. secretary of which is Mr. H. W. Dickinson, Barn Field, Riddlesdown Road, Purley, who will be pleased to answer inquiries.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Armoured Single-core Cables

Mr. Beavis's article in your issue of October 7th revives interest in the practicability of armouring single-core cables. He justly emphasises the fact that since the losses in question are induced outside the dielectric the effect on the temperature rise of the cable is very much less than might be expected from consideration merely of the absolute value of the losses.

It is somewhat surprising, however, to find Mr. Beavis quoting isolated experimental values which do no more than supplement results already published. Owing to the excellent work of L. Bosone (*L'Elettrotecnica*, January 5th, 1931) it is now possible to generalise on the subject and to forecast with reasonable accuracy the loss values for any wire-armoured cable. I have applied Bosone's method to the systems discussed in the I.E.E. paper mentioned by Mr. Beavis (Brockbank and Webb, *Journal I.E.E.*, Vol. 67, March, 1929) and have found that the agreement is exceedingly good. Further checks have been obtained on more recent investigations carried out in our laboratory, and in all cases the agreement between calculation and measurement is remarkable. It therefore appears that the problem is sufficiently simplified to enable special individual tests to be dispensed with and to permit designers to forecast system characteristics with considerable accuracy.

J. K. WEBB,
Cable Laboratory, Standard Telephones & Cables, Ltd.
London, E.16, *October 11th.*

Electricity in Travancore State

In the ELECTRICAL REVIEW, dated August 26th (p. 292), there appears a short account of "Electricity in Travancore State" under "Indian Electrical Notes." The proposals for the development of the Pallivasal Falls as described in those notes are not accurate, and I thought that you would like to have a correct account of the scheme that is engaging the attention of the Government of Travancore.

The Pallivasal Falls are on the Mudrapuzha River, a tributary of the Periyar. The minimum dry weather flow of the Mudrapuzha, based on records available for the last twenty years, is about sixty-four cusecs. The present proposal is to utilise only the minimum dry weather flow without creating any storage. Water is proposed to be diverted at the Pallivasal gorge and taken along a low-pressure pipe approximately two miles in length to a forebay, and thence to the power house by means of two high-pressure pipes, each approximately 8,300 ft. in length. The gross head available between the forebay and the power house tail race is 2,078 ft., and the present proposal is to develop 10,000 kW.

At a further stage, when the demand for power increases, it is proposed to construct a reservoir about eighteen miles higher up the river where a suitable site has been located. This site can impound sufficient water to discharge another sixty cusecs throughout the dry weather, which lasts only two and a half months. The capacity of the station can then be increased to 20,000 kW. As during the remaining nine and a half months of the year the river discharge is over 150 cusecs, it will be possible, if necessary, to further increase the output of the station for the greater part of the year, and this assumption is justified as the peak load of the station is reckoned to be some time during November and December, when there is no scarcity of water in the river.

A good portion of the power that is now proposed to be generated will be utilised in the immediate neighbourhood of the power station for supplying energy to the various tea estates and factories where the processes of manufacturing tea (drying, withering and rolling) will be carried out electrically. It is also proposed to transmit power to the plains by means of a 66-kV loop line, about 106 miles in length, to serve the industrial and rural areas. The main requirements of power in the plains will be for the drainage of rice fields and for the running of oil mills for crushing copra (dried coco-nut).

K. P. P. MENON,
Electrical Engineer, Public Works Department, Travancore.
Trivandrum, *September 27th.*

Prepayment Consumers

I have read Mr. Parnall's article in the REVIEW of October 7th on double-tariff slot meters with interest, but I am inclined to think that he is making a very bold statement when he writes that "two-part tariff and fixed-charge collectors are not popular with small consumers or with supply authorities." His remarks may be based on personal experience obtained in his locality, but they certainly do not apply to the whole of this country and other countries where slot meters are in use.

It is interesting to note that the type of meter referred to in his article fosters consumption. The double tariff slot meter, however, offers two decided disadvantages. (1) The consumers are likely to avoid the use of domestic appliances at times of daylight, when they are aware that they can obtain cheaper lighting by increasing their consumption to a predetermined figure; thus in time the tendency would be to concentrate the consumption in the lighting periods. (2) The effect of this concentration would embarrass the supply authorities. The lighting periods would occur at more or less the same time in all the homes in a locality, and load peaks of alarming proportions would be created.

The use of single or double tariff (load change operated) slot meters to collect a two-part tariff (fixed and unit charges) is most unfair to the consumer. It is nothing short of a penalisation for increasing the use of electricity since the more units are consumed the higher is the fixed charge. On the other hand, a two-part tariff slot meter collects the fixed charge at a constant rate, quite independently of the consumption. The higher the consumption, the cheaper is the price per kWh paid, since the fixed charge is spread over a greater quantity.

This system of charging and collecting is to the advantage of both parties: the supply authority is assured of a definite income apart from that received for electricity consumed which varies according to the time of the year; the consumer is quite clear in his mind as to the amount of fixed charge he has to pay; and he is given the facility of paying in very small instalments and of obtaining electricity at a cheap rate.

F. C. Z. CROSSE, B.Sc.
London, S.E.23, *October 15th.*

"Bakelite"—An Explanation

On page 569 of your issue of October 14th, under the heading "Installation Materials," it is stated that "Other companies who produce similar mouldings are Bakelite, Ltd. . . ."

We write to inform you that our activities are concentrated on the manufacture of Bakelite moulding materials and other Bakelite products but we do not produce Bakelite mouldings. Bakelite moulding materials which we manufacture are supplied to a large number of firms engaged in the electrical industry, as well as to the moulding trade, and it is these firms who produce the finished mouldings from our materials.

We should be much obliged if you would kindly insert this correction in your next issue so as to avoid any possible misunderstanding on the part of your readers.

BAKELITE, LTD.
H. V. Potter, *Managing Director.*
London, S.W.1, *October 17th.*

Waste Insulating Material

As I have already dealt with Mr. Rowell's criticism of my article no further reply is required to Mr. Freeman's endorsement of that criticism. I did not recommend the abolition of the use of raw insulating materials altogether, as there would not be enough waste to meet the demand. What I did recommend was the reclamation and use of waste that would otherwise be thrown away. To save any further misunderstanding I should like to state emphatically that I write from experience of what I have actually seen and done and thoroughly understand. I am obliged, for obvious reasons, to bring in outside evidence to support my statements and, further, to convince my readers that the scope in this direction is far greater than is generally appreciated.

Fierce objections, greatly exaggerated and misrepresenting facts, were raised when reclaimed rubber was first used in this country until it was definitely found, after trial and use here, that reclaimed rubber not only effected a great saving in costs in those days but also added certain additional properties to some classes of rubber goods that could not otherwise be attained; even at its present low price, raw rubber is used as a valuable admixture for certain classes of goods. These remarks, in a general way, may later apply to the reclamation of waste insulating materials here, but the countries now using these materials were forced to do so by the sudden change of economic conditions.

If Mr. Freeman will read my article on "Mica Powdering" he will see that some 10,000 tons of mica powder are used annually in the U.S.A., on the Continent, and in the United Kingdom; it has been recorded in reports of the U.S.A. and Canadian Governments that 3 per cent. of this is used for moulded electrical insulation, or, say, 300 tons per annum. The Canadian Government report on mica states that it is estimated that 12,000 tons of mica powder are consumed in the U.S.A., so that if we add only another 1,000 tons for the Continent it makes the amount, on the 3 per cent. basis, used

for moulded electrical insulation 390 tons per annum. Further, it is recorded in these reports that the best mica powder is made from factory scrap, as a cleaner, purer, and more reliable powder is obtained in this way. As this is a matter of vital importance to the electrical industry I tried it out in a London factory and then recommended its use here in the same way as it is used in the U.S.A. and on the Continent. Mines and factory scrap or waste in cutting mica for the consuming markets may also be included in this category.

Mr. Freeman says that to suggest its use as a filler for mouldings is nonsense. It would appear from this that he is writing beyond his experience, and that he is very far behind the times. In 1910 (from his own declaration two years before Mr. Freeman started working in the insulating material line) Mr. O. V. Thomas took out a British patent for making a plastic composition, consisting of powdered mica and resin for impregnating insulating materials, and in the same year Mr. H. P. Rasmussen took out a patent for making a plastic composition consisting of ground mica, asbestos, sulphur, and shellac, heated and moulded under pressure. Had synthetic resins been in general use then they would probably have been used in place of natural resin. Further, as far back as 1923, Mr. Kaula, then manager of the G.E.C. moulded insulation works (" Bakelite " mouldings), Witton, discussed the possibilities of the use of mica powder with me.

Again, in 1927 Mr. Barringer wrote some eight pages on the importance of the use of mica powder in the manufacture of moulded electrical insulation in the *G.E.C. Review*: " A recently developed use for powdered mica is in the production of moulded electrical insulation, using binders of various types, such as synthetic and natural resins " (see the Canadian Government Report on mica).

If waste mica costs nothing, the only charge would be the cost of grinding, and this can be done for about 30s. per ton, or a little over if a finer powder is desired for some special work. My object in writing is to help and not hinder progress, and I feel that even Mr. Freeman must admit that he cannot get many fillers, if any, delivered at his works at this low figure. Further, the purpose of mica powder when mixed with other fillers is to disperse them and to act as a lubricant in the same way as it does when mixed with rubber compounds.

If Mr. Freeman had studied the physics of the various qualities of mica more closely he would know that mica powder gives greater security, higher thermal resistance, and greater electrical strength (provided the right mica is used), which makes the mouldings in which it is embodied suitable for many purposes for which the ordinary mouldings not containing it may not be reliable enough.

The splittings from waste micanite are being recovered in the States; where the waste micanite is insufficient to justify the erection of a plant, a group of small factories send their waste to a Customs mill and pay a flat rate per lb. of clean mica splittings recovered.

I submitted my article to your esteemed journal because I wished to point out to those British manufacturers who were not already aware of it what was being done in other countries. I had hoped that, as your journal is universally read—I have seen it in different parts of the world—other qualified technologists would contribute to the discussion and give their experiences in this direction so that the written records on this important subject could be enriched for the benefit of all British manufacturers who cared to refer to them later.

If Mr. Freeman's experience on the Continent were pre-war or even just after the war, I can understand his attitude. Had he had access to the large, and even some small, works on the Continent during the financial stringency, he would have seen the heads of factories taking stock in all directions and straining themselves to see what waste materials they could reclaim for use.

I have had over twenty-nine years' experience of all branches of mica mining and manufacture and of the manufacture of other insulating materials, including " Bakelite " mouldings, varnished papers, and laminated products made therefrom. Furthermore, my book on mica and numerous articles on mica, micanite, and other insulating materials are sufficiently well known. Archibald A. C. Dickson.

London, S.W.2. *October 15th.*

Domestic Four-wire Services

In one of your leaderettes of October 7th reference is made to the running of four-wire three-phase services into private houses. To my mind this is definitely dangerous, inasmuch as the outers will differ in potential by more than 400 V a.c.

It is customary, I believe, to put heating on one phase, lighting on another, and power on the third; thus at least two phases are introduced into each room. This makes it possible for a person who is, say, replacing a lamp in a defective holder, while standing on a defective cooker, to receive a shock of over 400 V, which will probably have serious consequences. Of course the chance of both being defective is extremely small, but all the same it should be considered.

Surely it would be better to divide each street, or side of a street, into three sections, one being fed from each phase. In addition to increased safety, better balance would usually be obtained. Colin Pidd, B.Sc.

Durham, *October 13th.*

The E.T.B.I. Ball

With reference to the ball in aid of the Electrical Trades Benevolent Institution, which is to be held at Grosvenor House, Park Lane, on November 18th, I am pleased to say that many prominent men connected with the electrical industry have already signified their intention of being present. Among these I may mention the following:—The Minister of Transport, and Lt.-Col. Cuthbert M. Headlam, M.P., his Parliamentary Secretary; Lord Meston, President of the British Electrical Development Association; Sir Andrew Duncan, Chairman of the Central Electricity Board; Sir Ralph Wedgwood, Mr. Frank Hodges and Sir Archibald Page, of the Central Electricity Board; Sir John Brooke, C.B., and M. W. W. Lackie, C.B.E., of the Electricity Commission.

The support given by these gentlemen is evidence of the importance of the work being carried out by the Institution, and that its efforts to give help to those in distress are well worthy of support.

Any information as to the work of the Institution will be gladly provided by the Secretary, Captain Keeping, to whom subscriptions may be sent, and applications made for tickets for the ball. R. P. Sloan,

9, Southampton Street, W.C.1, *President*, E.T.B.I.
October 12th.

The Grid Crossing over the Thames

Referring to the photographs on pages 426 and 427 of the Electrical Review of September 23rd, showing the hoisting into position of the conductors over the Thames, we would like to point out, as manufacturers of the conductors and sub-contractors to Messrs. Callender's, that the " wires " mentioned are really stranded conductors, and each of the six stranded conductors, as well as the earth wire, consists of a core of seven cadmium copper wires surrounded by eighty-four phosphor bronze wires, not aluminium bronze as stated.

It was originally intended to use aluminium bronze stranded conductors with a cadmium copper core, but, owing to the presence of ammonia in the atmosphere at Woolwich, it was decided to use phosphor bronze instead of aluminium bronze, phosphor bronze being unaffected by the action of ammonia and at the same time having good anti-corrosive properties. Each conductor was supplied in a length of 6,350 ft., with no joint whatsoever. Thos. Bolton & Sons, Ltd.

Widnes, *October 14th.* G. H. Whiteway, *Sales Department.*

Proposed Electrical Engineers' Club

I have noted with interest recent correspondence in your columns with reference to the formation of another Engineers' Club and would like to draw the attention of your readers to the existence of the Freemasons' London Club, 9-10, Alfred Place, Bedford Square, W.C.1.

There must be many engineers, both in London and the provinces, who are members of the Masonic craft, and our club offers to them, at a modest entrance fee and subscription, all the amenities that the majority may require in a purely social organisation. As it has only been recently opened, the club does not provide sleeping quarters, but negotiations are pending whereby it is hoped that members may secure accommodation at good hotels in the vicinity at preferential terms.

There is a limited number of vacancies, and I should be happy to forward further particulars to any engineer (he must, of course, be a Freemason) who would contemplate membership. As this club has been formed for the purpose of social intercourse only, touting for business on the premises is strictly forbidden. Edwin L. Bride,

London, W.C.1, *October* 17th. *Honorary Secretary.*

I should like to ask Hr. H. C. Vince whether the principals of firms of repute will be allowed to dine with the gentlemen.

Bexleyheath, *October 18th.* A. J. Abraham.

No Free Admission

Buyers visiting the British Industries Fair at Olympia and the White City next year will be charged 2s. for admission, receiving in exchange a badge admitting them for the period of the Fair, from February 20th to March 3rd. They will, however, be admitted free, as hitherto, to the Birmingham section at Castle Bromwich.

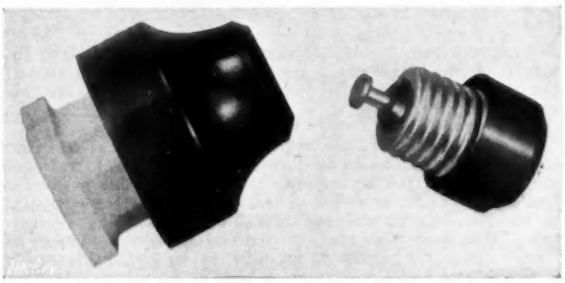
New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

Screw-type Lampholder Adaptors

Owing to the shortening of the light centre length of the 200-W and 1,000-W gasfilled lamps, it is necessary, in order to bring the two lamps into correct focal position in relation to lighting apparatus, to employ some form of adaptor. A set of components has been designed by the EDISON SWAN ELECTRIC CO., LTD., 123, Queen Victoria Street, E.C.4, which not only enable this to be done, but at the same time give the opportunity of changing an ordinary screw-type holder into one of the H.O. safety pattern by making it possible to add an insulating skirt.

The adaptor consists essentially of a metal shell on which is rolled a continuous thread, the upper portion being of the size of a lamp cap and the lower the size of shell of the lampholder. At the upper end vitrite insulation is fixed similar to that used in lamp caps and a metal plunger works freely through this. An insulator "A," or an insulator "B," and H.O. skirt, internally threaded, screws over the larger or lower



"Ediswan" adaptors of screw-type holders

end of the adaptor. The insulators and skirt are both of moulded "Fabrolite." The Edison screw adaptor and insulator "A" cost 15s. 6d. per dozen or 27s. 6d. with insulator "B" and a H.O. skirt. The Goliath Edison screw adaptor with insulator "A" cost 26s. 9d. a dozen or 40s. 6d. with the H.O. skirt and insulator "B."

An Accumulator Torch

The "Nife" torch

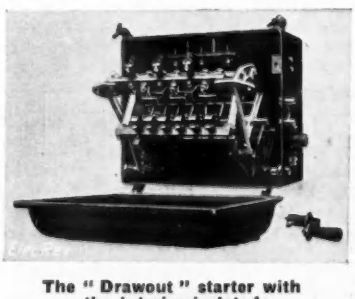
The new accumulator pocket lamp marketed by BATTERIES, LTD., Hunt End Works, Redditch, incorporates a "Nife" steel plate accumulator. It is claimed that short-circuits, sulphation or reverse charging will not harm it, and that it can remain idle for over twelve months or give eight hours' continuous light on one charge.

The lantern case is constructed out of sheet steel and has a cellulose enamel finish. A positive action lever switch actuated by two ebonite push buttons on the top of the case enables the lamp to be operated by the same hand as is carrying it. The plated reflector is a sliding fit in order to provide a focusing adjustment when a new bulb is fitted.

The complete lamp weighs 2¾ lb., measures 8 in. by 3½ in. by 1½ in., and costs £1 5s.

An Air-break Star-delta Starter

The "Drawout" type V air-break star-delta starter is a new product of the AIREDALE ELECTRICAL & MFG. CO., LTD., Bowling Old Lane, Bradford. It has a capacity of 5 h.p. at 200 V or 10 h.p. at 400 V, and has been designed as a low-priced starter for small squirrel-cage motors. The outstanding feature of the "Drawout" is the manner in which it provides for the complete isolation of all working parts so that adjustments and repairs may be carried out in safety. Two swivel pins support the case which is securely held by two screws, while a single screw holds the starting handle to the drum.

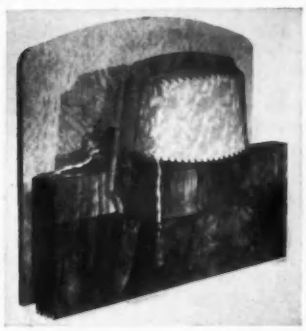


The "Drawout" starter with the interior isolated

The starter is made "dead" by removing the handle and the two screws when the interior may be swung outwards away from any live contacts as shown in the illustration. This facility of repairing reduces stoppages to a minimum. In the event of the repair being a lengthy one the whole interior can be replaced by a spare within five minutes. Type UA with a no-volt release costs £2 10s. 6d.; type UC with three thermal overload trips in addition costs 3s. 6d. extra.

Luisante Bedlights

A noteworthy feature about the new Luisante bedlight is that the lamp, which is fitted in a "Bakelite" lampholder, is positioned above the bedhead panel, and is rigidly fastened in this place by a rubber covered spring clip. It is claimed that for this reason the heat from the lamp cannot possibly damage the polished surface of the bed panel. The forward projection of the screen is very small. The fitting is made up on a wood panel which can be finished to match the bed, or decorated with inlay work to suit any colour scheme, and adequate ventilation is provided by leaving the back of the fitting open, this also providing a soft toned room light on the wall, in addition to a clear light for reading and a coloured light passing through the screen, giving a subdued but adequate light in the room.



A "Luisante" bedlight

This firm is also making a small mirror light with a horseshoe shaped frame polished to match the dressing table or coloured to match the furnishings. It is affixed to the top of the mirror with spring clips and the frame carries a bracket to which is fitted a switch lampholder, the lamp being surrounded by a screen which prevents direct glare but does not interfere with the efficient illumination of the mirror.

Both these appliances are manufactured by Luisante Fittings, 79, Duke Street, Liverpool, and are distributed by SPECIALITIES, LTD., Mount Pleasant, Liverpool. The prices range from 21s. to 33s. according to finish.

Portable Drilling and Screwdriving Machines

The "Wolf" ball-bearing drilling machines types "BW4" and "BW4c" are equipped with motors suitable for d.c. or a.c. at 25-60 cycles. Model "BW4," priced at £8 15s., is fitted with a drill spindle bored No. 1 Morse taper socket. When necessary straight-shank twist drills can be used by fitting a chuck with a No. 1 morse tap arbor into the drill spindle socket. The weight is 14 lb. and the length 11 in.

The other type has been designed for use with straight-shank twist drills. The spindle is machined for solid and tapered to take the ½-in. three-jaw chuck which is fitted as standard; its price is £9 15s. The drilling capacity of both models is ½ in. in steel and ⅝-¾ in. in wood.

The "Wolf" ball bearing portable electric screwdriving and nut-setting machine, type "BWS1," also introduced by MESSRS. S. WOLF & CO., LTD., 115, Southwark Street, S.E.1,

The "Wolf" drilling machine (below) and screwdriving machine (left)

costs £8 15s. A reverse plug is fitted as standard to enable nuts and screws to be withdrawn and the tool-holder is provided with a clutch which is normally held out of drive by means of a spring. Pressure on the screw at the side of the machine brings it into operation, and a slight easing of the pressure when the screw is nearly home checks the rotation of the tool. This also applies to the two drilling machines, "BW4" and "BW4c." The armature spindle is mounted on ball bearings and the switch and brush gear are easily accessible for inspection. The speed of the bit on load is 450 r.p.m. The weight is only 7½ lb., the length being 14 in. and the diameter 3¾ in.

A Wiring Continuity Tester

I.E.E. Regulation No. 127B requires that ". . . . the metal conduit or metallic envelopes of cables, in all cases where such methods are used for the mechanical protection of electrical conductors, shall be tested for electrical continuity, and the electrical resistance of such conduit or sheathing, measured between a point near the main switch and any other point of the complete installation, shall not exceed 2 ohms."

While the need for this regulation is generally recognised, hitherto apparatus suitable for making the test has not been available. EVERSHED & VIGNOLES, LTD., Acton Lane Works, Chiswick, W.4, are, however, now marketing a combined insulation and continuity tester, based on the design of the well-known " Meg " type of " Megger " instrument produced by the company.

The new instrument is direct reading and has two scales on its dial, the change from one test (and scale) to the other being effected by a simple switch. It is available with or without a constant pressure device on the generator and in three ranges, developing 100, 250, and 500 V by turning a handle.

Testing for continuity is done at a few volts only; the continuity scale reads up to 100 ohms, but the first half of it enables resistance up to 2 ohms to be measured in fractions of an ohm. The instrument weighs only 6.75 lb. and is priced at £17 17s. 6d. without carrying case.

Plaque Heaters

The " Maxheat " plaque heaters are non-luminous radiant heaters, very suitable for well-ventilated buildings such as schools, hospitals, and sanatoria. The plaques are all of the same design, but can be obtained in various colours. The heating element is situated behind the plaque and is totally enclosed. It is made of nickel-chrome wire embedded in a ceramic material under pressure and has a standard loading of 500 W, although 600-W models can be obtained. An 18-in. chain designed to conceal the flexible cables supports the plaque and a 5-A pull switch can be mounted on the back of the plate at an extra cost of 11s. 6d. The diameter is 14 in., and when in use the centre design changes colour. These " Maxheat " heaters cost £1 18s. 6d. and are made by THE WARDLE ENGINEERING CO., LTD., Old Trafford, Manchester.

Legal

The British Electric Transformer Co., Ltd.

In the Chancery Division on Monday last Mr. Justice Bennett had before him a petition by the British Electric Transformer Co., Ltd., for confirmation of the reduction of its capital from £1,000,000 to £565,625.

Mr. Jenkins, K.C., for the company, said that all the necessary resolutions in connection with the proposed reduction had been passed. The difference between the million capital and the amount to which it was proposed to reduce it represented loss of capital. The loss was clearly proved and was really part of a scheme in the nature of a consideration of this company with Crompton Parkinson, Ltd. There were two sets of preference shareholders. The company was formed in 1903 and its authorised capital was £1,000,000, *viz.*, 700,000 ordinary shares and 300,000 preference shares of £1 each. The issued capital was £325,000 ordinary shares, and all the preference shares of £300,000, making a total issued capital of £625,000. That left £375,000 unissued ordinary shares.

The loss which was to be written off was some £430,000. That was to be written off the issued capital, leaving the unissued capital as it stood. The loss was divided between the ordinary shareholders and the preference shareholders, the preference shares being reduced by 10s. and the ordinary shares by 17s. 6d. a share.

His Lordship sanctioned the reduction and approved the minutes.

Consulting Engineers' Claim

In the Chancery Division on Tuesday last, Mr. Justice Luxmoore heard an action brought by Messrs. Handcock & Dykes, consulting engineers, against the London and Home Counties Joint Electricity Authority and the Leatherhead and District Electricity Supply Co., Ltd., for declarations and ancillary relief under the terms of an agreement made between the plaintiffs and the defendant company dated March 19th, 1928.

The plaintiffs' case was that by the agreement the company undertook to employ them as consulting engineers for a period of ten years from January 1st, 1928, until December 31st, 1937, and thereafter from year to year until terminated by one year's notice in writing. Clause 3 provided that the company would each year pay to the consulting engineers for their services 5 per cent. upon the total capital outlay during the year upon extensions, reconstructions or conversions, whether carried out completely by contractors or partly by the company's own staff, excluding the cost of land, and the 5 per cent. was to be charged on the capital outlay, either against new or existing capital or paid for out of revenue.

On January 1st, 1931, the Leatherhead undertaking was transferred to the Joint Authority and the plaintiffs alleged that they were at all material times willing to render to the company or to the Joint Authority the services contemplated by the agreement and that in fact they did during the year 1931 perform such services. During the year 1931 capital was laid out in extensions, reconstructions and conversions of the undertaking, and as each of the defendants had refused to give plaintiffs accounts showing the amount of capital laid out or the remuneration payable to the plaintiffs in respect thereof under clause 3 of the agreement, they brought the present action claiming against both defendants' declarations that upon the true construction of the agreement they were liable to pay to the plaintiffs in each year of the currency of the agreement a sum equal to 5 per cent. upon the capital outlay (excluding cost of land) during the year upon extensions, reconstructions and conversions of the undertaking, and also an account of the capital outlay during the year ended December 31st, 1931, and of the moneys payable to the plaintiffs in respect thereof.

The defence was a denial that the plaintiffs had disclosed any cause of action. They denied that any capital was laid out in the year 1931 in extensions, reconstructions, or conversions of the undertaking, and alternatively they said that if there was the plaintiffs were not instructed to prepare any detailed plans or specifications or to obtain any tenders for the work. The defendants further contended that the relief claimed by the plaintiffs by way of declarations and an account was not the appropriate relief having regard to the nature of the agreement. The defendants contended that if the plaintiffs were entitled to any relief against them (which was denied) in respect of the agreement it was in damages only.

At the conclusion of the arguments His Lordship said that the only question which he had to decide was as to the true construction of the agreement. He came to the conclusion that the plaintiffs on the case before the Court were entitled to succeed. He accordingly granted the following declaration " that upon the true construction of the agreement of March 19th, 1928, moneys payable to the plaintiffs under clauses 3 and 4 of the agreement were to be calculated at the rate of 5 per cent. upon capital outlay during each year upon the extensions or reconstructions or conversions of the electricity supply undertaking in Leatherhead in respect of which the consulting engineers were instructed in that year to prepare detailed plans and specifications within clause 2 of the agreement." The defendants had submitted to an account. The defendants must pay the costs of the action and the costs of the account would be reserved.

Pending Action Against a Belgian Company

In the Chancery Division on October 12th, Mr. Lionel Cohen, K.C., applied to Mr. Justice Farwell for him to fix a day for hearing of an action brought by Mr. Josiah Feist, against Intercommunale Belge d'Electricité S.A., and Mr. Cohen, without stating the nature of the action, said it was one which would arouse considerable interest in the City of London, and would take some time to argue.

His Lordship fixed October 26th for the hearing, subject to anything part heard.

The Radiovisor Litigation

On Thursday and Friday last week Mr. Justice Lawrence, sitting in the King's Bench Division, resumed the hearing of the action in which Radiovisor (Foreign and Colonial), Ltd., sued Radiovisor Parent, Ltd., claims £200,000 damages and the return of 100,000 £1 shares. The claim was based on misrepresentation when the defendants sold the foreign rights in a selenium light bridge to the plaintiffs. The defendants denied both misrepresentation and damage.

The plaintiffs pleaded that the selenium bridge did not yet fulfil a representation that it was capable commercially of mass production.

This was the thirty-fifth day of the hearing of the case, which had been adjourned from a date just before the Long Vacation. Further evidence was now called on behalf of the defendants.

Mr. John S. Highfield, consulting engineer, supported defendants' case. In cross-examination he said that in all mass-produced commodities the good articles were separated from the bad, and graded. He was aware that trouble had arisen in connection with the constancy of the bridge during the process of operation. Experiments had shown that even under suitable conditions the bridge would run on a particular resistance for some time and then " run off."

Mr. Sidney Clutterbuck also gave evidence. The case is proceeding.

Winding-up Orders

In the Companies Court on Monday last, Mr. Justice Bennett made orders for the compulsory winding up of Beam, Ltd., Mechanism, Ltd., and J. Holbrook & Tattersall, Ltd.

Winding-up Petition Adjourned

In the Companies Court on Monday last Mr. Justice Bennett had before him a petition for the compulsory winding up of Ward Electrical Co., Ltd. Counsel said that the petition was the company's own petition to protect itself. It was now in negotiation with its creditors for a scheme. He therefore asked that the petition should be allowed to stand over for four weeks; the petition was not opposed.

His Lordship ordered the petition to stand over for four weeks.

Electricity and Shipping.

(By A MARINE CORRESPONDENT)

A fruitful market which awaits development

ALTHOUGH the electrical industry is suffering less than many others at the moment, there are few electrical manufacturers, apart from those in the radio section, who are not complaining of a shortage of work, and new fields for expansion are being eagerly sought by the whole industry from the largest combine to the smallest workshop. Fresh applications of electricity in other industries are constantly being investigated, and one firm looks hopefully towards railway electrification, whilst another sees its salvation in converting the housewife to the idea of an all-electric home.

In the domestic and industrial fields there has been a fair measure of co-operation among the electrical manufacturers of this country, and without it their efforts in many directions would undoubtedly have been much less successful. The work carried out by B.E.A.M.A., E.D.A., E.L.M.A., C.M.A., and A.M.A. has been invaluable, and every section of the electrical industry has benefited by it. There is one market which still awaits exploitation, however, and curiously enough it is likely to prove an extremely profitable one if tackled correctly. This market is the one offered by the shipbuilding industry.

Retort may be made by mentioning the s.s. *Viceroy of India*, the *Monarch of Bermuda*, the *Queen of Bermuda*, and the sister ships *Strathaird* and *Strathnaver*, all of them high-powered passenger liners, and all of them electrically propelled. But these ships are noteworthy because they are electrically driven, whereas to-day it should be strange to find ships of this type which were not.

Breaking Down Conservatism

The electrical industry is one of the largest in the country; it has highly trained technicians, skilful sales executives, and its total capital resources are enormous, yet the progress made in the marine market has been relatively slow compared with the development on land. It is said that shipowners and shipbuilders are conservative and prejudiced against electrical apparatus, but that argument does not apply solely to shipping people. No section of the community is more conservative than the average housewife, and she is rapidly being educated to use electricity on a wider scale. The electrical industry in the United States long ago realised the possibilities of the marine market, and to-day we find a large number of electrically propelled ships of all types in America. As an instance, it might be mentioned that there are over forty United States tugs with electric drive, but as yet there is none in this country.

But, leaving aside the question of electric drive, it is surprising that in this, which may be known in the future as the electrical age, there are hundreds of ships afloat which depend on oil lamps for illumination at night. There are ships built to-day with tiny steam generating sets, which are often shut down in the daytime and in port, when stand-by oil lamps are the only means of lighting, and even when the generator is in commission the standard of lighting is deplorable. Acetylene lamps are still used by a great number of trawlers.

The Modernisation of Existing Vessels

Our shipowners and shipbuilders in general still favour steamships, and in a coal-producing country this attitude may be excusable. These steamships almost invariably have steam driven auxiliaries for deck and engine room service. Steam driven auxiliaries are notoriously inefficient compared with electrically driven machinery, but cheaper in first cost. There are British-owned and British-built ships which are quite modern and electrified throughout even to the galley, but the number of high-class cargo ships so equipped is very small. Many of the steamships now laid up could with advantage be modernised, fitted with electrical auxiliaries and perhaps would be able to pay their way even with the present low freight rates.

To say that the marine market has been neglected by the electrical manufacturers would be obviously untrue, for there has been a great deal of work done. It is, however, true to say that there has been no concerted action on the part of the electrical industry. A great deal of effort has been expended on competition which could have been utilised in extending the sales of electrical equipment for marine use, to the ultimate profit of everybody interested.

We have had better lighting campaigns for the home, shop and factory. There has been a co-ordinated drive to extend the use of electricity in the home. It is clearly time for a "Better Lighting Aboard Ship" campaign, and a well-thought-out system of propaganda to educate shipping people on the application of electricity generally. At the moment many electrical manufacturers are advertising and carrying on propaganda independently, but this policy cannot hope to be so successful as united action on the part of the various branches of the electrical industry. No single manufacturer can hope to capture the marine market for himself, and there is room for everybody if the matter is handled on proper lines.

In the United States conditions may have been easier for the electrical manufacturers than they are in Europe, but it is clear that in America the value of the market was realised and a determined attack was made on it. It is true that shipowners are badly off, but new ships must be built in due course, and much of the present idle tonnage will never be able to make profits on the freight rates probable in the future, unless it is modernised. When shipowners have ordered new ships and shipbuilders are busy building them it will be too late to talk of new ideas. Now is the time to commence work on the marine market, while the people in it are looking for ways of improving the efficiency of their ships.

Closer Contact Desirable

There should be close contact between the electrical industry and the shipbuilding industry. Shipbuilders naturally wish to build the main engines, and the increasing use of electricity for propulsion means that the propelling machinery is built by the electrical manufacturer, and the shipbuilder loses work. Individual firms cannot make agreements so easily as the whole industry, and there is plenty of opportunity for the electrical industry to consult with the shipbuilders and find means of serving both their interests. It is obvious that there are many ways in which the individual manufacturers in the

Electrical window cleaning is a new development we believe. The illustration shows an electrically driven revolving brush of thick felt being used on a shop window

electrical industry could work together to increase the value of the shipping industry as a market, and it would be wise to consider the question now.

Without co-operation in the past the electrical industry as a whole would not have made the progress it has done, and it is strange that such an extensive market as that offered by increasing the use of electricity aboard ship has not been considered worth organised action before this date.

Electric Cooking in Switzerland

Among the papers read at the recent congress in Paris of the International Union of Producers and Distributors of Electricity was one by M. A. Burri on the progress of electric cooking in Switzerland, in the course of which he stated that the number of electric cookers and boiling plates in that country had increased from 93,000 in 1926 to 172,590 in 1931, and the corresponding load from 167,000 to 468,355 kW. The bulk of the users were employés and artisans, these representing 56 per cent. of the total. So far as hotel and large electric cooking installations were concerned, only relatively small progress had been made in Switzerland, there being only 636 such installations out of about 30,000 in the country.

Canada's Tariff Concessions

Changes effected by the Ottawa agreements

THE Canadian Parliament on October 12th passed into law the Customs Tariff changes set forth in Schedules "E" and "F," in respect of which secrecy has been maintained since the signature of the Canada-United Kingdom Trade Agreement. The whole of these agreements have now been published by H.M. Stationery Office (Cmd. 4174), and it is now possible to estimate what benefits may be expected by British electrical and allied manufacturers as their part of the bargain entered into by the powerful delegation sent by the United Kingdom to Ottawa.

The first feeling of electrical manufacturers regarding Schedule "E" will be one of regret that the British delegation proved unable to secure any very important immediate reductions in duties on electrical material imported from this country. Rates have been raised considerably during the past two years, coupled with which manufacturers have had to cope with the annoyance and uncertainty associated with changes in Sales Tax and Special Excise Tax, and with fluctuating special (or "Dumping") duties making fixed quotations a matter of extreme difficulty in the case of machinery manufactured and exported under contract. It is, however, important in this connection that attention should be directed to the undertaking entered into by the Canadian Government in Articles 10 to 17 of the Agreement relative to the somewhat novel principle of "competitive preference." Everything must depend upon the good faith with which these undertakings are carried out, and it is obvious that succeeding administrations in their attitude to the tariff question will need to be governed not only by considerations of domestic policy, but will act in the sure knowledge that their decisions are appraised, criticised or approved by interests in the Mother Country whose right to question such acts is for the first time in our constitutional history conceded by statute.

Competition with Canadian Products

From the point of view, therefore, of the electrical and allied industries, their entry into the large and growing market of Canada is for the future governed by the fact that no longer may protection be conceded to domestic industries not reasonably assured of sound opportunities for success, and that rates on British goods may not rise above a level precluding them from the opportunity of fair competition with domestic industry. A Tariff Board is to be created, the membership of which will be under constant scrutiny in Canada and in Great Britain, and the British Government is conceded the right to apply for the review of duties hindering competition by British firms in the Canadian market; Parliament is to be invited to vary such duties according to reports presented by the Board. No existing rates on British goods may be raised except after such an inquiry as is foreshadowed above, and manufacturers in the United Kingdom have the right of audience when their case is being considered by the Board.

The existing situation with regard to arbitrary values, special excise taxes and fluctuating dumping duties is recognised as temporary, and such obstructive measures are to be abandoned as soon as financial conditions permit. Already business interests are agitating for speedy action in this connection, the textile trades being particularly anxious with regard to the Christmas trade.

Schedule "E"

Coming now to the provisions of Schedule "E" itself, it appears that provision is made for the free entry of electric telegraph or telephone apparatus, and of radio apparatus, and complete parts thereof, of British manufacture, formerly dutiable at 15 per cent. *ad valorem*. The Intermediate Tariff rate, applying to material of Swedish, Belgian or Swiss origin, for instance, among the most-favoured nations, is fixed at 25 per cent. as before, whilst the General Tariff rate applying to German, French or United States manufactures, is 30 per cent., as against 27½ per cent. previously. The value of this trade in recent years has been affected by the current trade depression, but in 1929 imports of electric telegraph instruments and parts were valued at $622,775, followed by a total of $463,628 in 1930, and $95,280 a year later. Imports of telephone apparatus reached $2,716,807 in 1929, rose to $2,931,927 a year later, and then fell to $1,515,102 last year. A similar decline has taken place in imports of radio apparatus from $10,198,060 in 1929, to $7,759,532 in 1930, and $4,784,512 last year, these figures, by the way, being exclusive of radio valves, the trade in which amounted to $524,872 in 1929, $327,728 in 1930, and to $113,760 last year. There are no doubt other imports of certain minor parts specially classified, but not susceptible of identification.

The Agreement further provides for the free entry of British-made electric storage batteries, composed of plates measuring not less than 11 in. by 14 in., and not less than ¾ in. in thickness and complete parts thereof, previously dutiable at 15 per cent. The Intermediate Tariff rate remains at 25 per cent., and the General Tariff rate at 27½ per cent. Free entry is also conceded in the case of flame-proof electric switchgear, for use underground in coal mines, the Intermediate Tariff rate being 20 per cent., and the General Tariff rate 30 per cent. Previous rates were 15 per cent., 25 per cent., and 30 per cent. respectively. Item 446 continues the free entry from Great Britain of electric steam turbo-generator sets, 700 h.p. and greater, of a class or kind not made in Canada, and complete parts thereof, the Intermediate rate being raised to 20 per cent., and the General rate to 25 per cent. Previously, the rates were:—Free, 15 per cent., and 20 per cent. respectively.

The final decision as to whether any article is "of a class or kind not made in Canada" has hitherto rested with the Department of National Revenue without provision for appeal, and it remains to be proved whether this concession will, in fact, prove to be of real value. Imports last year were valued at $221,802, no separate classification being in existence previously.

Reduction of Duties on Materials

The electrical industry will be affected to some extent by the reduced preferential rate of 10 per cent. upon "Wire of all metals and kinds, not otherwise provided for," previously dutiable, if British, at 15 per cent., the Intermediate Tariff rate being raised from 17½ per cent. to 30 per cent., and the General Tariff rate from 20 per cent. to 35 per cent. Wire cable, of iron or steel, is now 15 per cent. as before, but the Intermediate rate is raised to 25 per cent. (formerly 22½ per cent.) in the case of twisted wire, and from 25 per cent. to 30 per cent. in the case of single wire, in which case the General Tariff rate remains at 30 per cent. Aluminium wire and cable, twisted or stranded, reinforced with steel or not, becomes free under the British Preferential Tariff, as against 18 per cent. net previously, the Intermediate Tariff being raised from 27½ per cent. to 30 per cent., at which the General Tariff remains unchanged. Copper wires and cables are apparently unaffected by the Agreement, but free entry is conceded to copper in bars or rods imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables, the Intermediate and General Tariff rates being 10 per cent., whilst previously free.

Free entry is also conceded in the case of sheets of iron or steel, hot or cold rolled, with silicon content of 0.075 per cent. or more, when imported by manufacturers of electrical apparatus, the Intermediate and General Tariff rates being both 12½ per cent. as before. Previously, the preferential rate was 7½ per cent. Electric tramway rails of British manufacture will enter free of duty, if weighing not less than 75 lb. per lineal yard, and of shapes and lengths not made in Canada. The Intermediate and General Tariff rates are both $7 per ton. Formerly, the preferential rate was $4.50 per ton, and the Intermediate rate $6 per ton.

Magnetos, starting motors, electric generators, and certain other material of a class or kind not made in Canada, imported by manufacturers of motor trucks, are free of duty under the British Preferential Tariff, the Intermediate Tariff rate being 17½ per cent., and the General Tariff rate 20 per cent. The former rates were 15 per cent., 17½ per cent., and 20 per cent.

The new rates came into effect with the opening of the Custom Houses in Canada on October 13th.

Swedish Railway Electrification

The Swedish Railway Board is preparing a scheme for the further electrification of the State Railway lines after the programme now being carried out on about 900 km of line has been completed at the end of 1933. The electrification of the Stockholm-Gothenburg main line, carried out some years ago, has proved to be most remunerative, and there seems to be no doubt as to the usefulness of further electrification. The new Labour Government will be as anxious as previous Governments to arrange for public works in order to cope with unemployment, and if public finances permit it may therefore be considered certain that any proposals made by the administration of the State Railways for further electrification will be laid before the Riksdag by the Government and approved. The line now chiefly being considered for electrification is that between Stockholm and Aange, 484 km long, connecting Stockholm with the interior of North Sweden. The cost is estimated at about 50,000,000 kr. According to *Stockholms Tidningen*, the board of the State Railways has already concluded preliminary contracts with a number of Swedish firms for materials and locomotives required. Swedish materials will be used to the greatest possible extent.—*Reuter's Trade Service* (Stockholm).

British Overseas Electrical Trade in September

ELECTRICAL exports during September were the lowest for any month during recent years. Imports, on the other hand, though they fell to less than half the value recorded for the corresponding month of last year, show a tendency to increase and are slightly above the August figure.

It will be observed that the decline in exports is accounted for to a large extent by a considerable falling off in shipments of electrical machinery. In particular British India and South Africa diminished their purchases of this class of apparatus and took only £46,252 and £15,922 worth respectively, representing decreases of £40,444 and £17,368 as compared with August. Shipments to European countries, however, show an advance from £82,768 to £115,429.

As compared with September, 1931, exports of electrical machinery as a whole are substantially lower, the most outstanding decrease being in the purchases by "other countries," which fell from £118,828 to £28,779. Small increases were recorded in the exports to Japan and Canada.

	Exports.			Imports.			Re-Exports.		
	Electrical exports for Sept., 1932.	Inc. or dec. as compared with Aug., 1932.	Inc. or dec. as compared with Sept. 1931.	Electrical imports for Sept. 1932.	Inc. or dec. as compared with Aug., 1932.	Inc. or dec. as compared with Sept. 1931.	Electrical re-exports for Sept., 1932.	Inc. or dec. as compared with Aug., 1932.	Inc. or dec. as compared with Sept. 1931.
Insulated wires and cables ...	£75,363	− £8,830	− £23,314	£22,839	+ £5,999	− £35,339	£58	− £229	− £196
Electric carbons	2,314	+ 1,518	− 164	12,267	+ 3,696	− 20,779	38	+ 21	− 13
Arc lamps and searchlights ...	1,255	+ 677	+ 1,074	80	+ 80	− 258	36	+ 36	− 215
Incandescent lamps ...	29,197	+ 158	+ 4,749	14,858	+ 2,741	− 31,273	649	+ 57	− 176
Other lighting apparatus ...	24,507	+ 823	− 4,428	26,090	+ 1,860	− 35,973	1,223	+ 404	+ 109
Batteries and accumulators ...	52,577	+ 4,174	− 9,972	8,217	+ 2,439	− 88,462	56	− 156	− 782
Meters and instruments ...	18,595	− 843	− 1,632	19,663	− 3,900	− 11,069	103	− 219	− 327
Unenumerated electrical goods and apparatus	85,934	+ 12,937	− 21,260	55,435	+ 7,769	− 44,340	1,641	− 880	− 1,588
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cables (not submarine)	19,881	+ 2,589	+ 1,936	331	− 568	− 1,173	18	− 54	+ 18
Submarine telegraph and telephone cables...	4,350	− 13,538	+ 3,361	—	—	—	—	—	—
Telegraph and telephone apparatus	118,899	— 5,100	+ 788	125,959	+ 22,581	− 33,956	1,362	+ 405	− 2,954
Electrical Machinery—									
Railway and tramway motors	381	− 4,774	− 619	—	—	—	—	—	—
Other motors and generators	95,818	+ 30,537	− 74,953	—	—	—	—	—	—
Unenumerated electrical machinery	145,420	− 61,014	− 69,897	37,247	− 38,646	− 80,000	5,558	+ 995	− 4,520
Total	£674,491	− £40,686	− £194,331	£322,986	+ £4,051	− £382,622	£10,742	+ £380	− £10,644
Decreases for the first nine months of the year... ...	Exports. £2,065,241			Imports. £2,373,412			Re-exports. £90,075		

New Zealand's Electrical Trade

IN a Department of Overseas Trade report dealing with economic conditions during 1931 and up to the end of April, 1932, H.M. Trade Commissioner at Wellington remarks that the depression in the year 1930 lasted throughout 1931, during which New Zealand's overseas trade suffered from a continuance in the fall of prices of export products.

Local production in the electrical engineering industry showed a slight advance, the total value of manufactures increasing from £134,411 in 1930 to £140,401 in 1931 and the number of factories in operation from thirty-two to thirty-six. The supply of heavy electrical machinery is very largely in the hands of United Kingdom companies.

In the past most of the batteries and cells have been imported from the United States and Canada. There have, however, been strong influences working against the imports from these countries and importers have gone elsewhere for their requirements; hence a considerable rise in imports from Australia without causing a proportionate fall in imports from the United Kingdom. Unfortunately British batteries have not the reputation enjoyed by products of other countries, but the position shows considerable improvement compared with what it was a year or so ago, there now being several good makes of batteries made in the United Kingdom on the market.

The radio import trade is one of the few that have not shrunk owing to the prevailing depression and the demand has a tendency to expand, radio sets still being something of a novelty to the rural population. British radio components are more in demand than complete sets, possibly because the design of the sets does not suit New Zealand conditions. The proportion of business secured by the United Kingdom in parts cannot be expected to increase so long as replacements are required almost solely for American sets.

The adverse rate of exchange in conjunction with a high tariff, has probably been the chief factor in bringing down the imports generally, and it may be anticipated that in the near future the balance of trade will so adjust itself as to conform more closely with the results experienced during the last two years.

The Dominion's Electrical Imports

The values of electrical imports last year, together with rates of increase or decrease as compared with 1930, are shown in the following table, which has been compiled from the recently issued annual trade returns.

	1931. £ (Thous.)	Inc. or dec. as compared with 1930.
Batteries and cells—		
Total	107	− 60
From United Kingdom ...	38	− 9
,, Canada	25	− 26
,, United States ...	29	− 31
,, Australia	12	+ 7
Insulated cable and wire—		
Total	175	− 192
From United Kingdom ...	164	− 182
,, Holland	4	− 7
Insulators—		
Total	27	− 3
From United Kingdom ...	13	− 2
,, Canada	10	− 1
Filament lamps—		
Total	116	− 18
From United Kingdom ...	104	+ 3
,, Holland	5	− 11
Other electric lamps—		
Total	13	− 17
From United Kingdom ...	4	− 3
,, Germany	3	− 1
,, United States ...	4	− 11
Electric ranges—		
Total	21	− 32
From Canada	18	− 32
Wireless receiving sets—		
Total	148	+ 12
From United Kingdom ...	2	− 4
,, Canada	10	− —
,, Holland	2	− 9
,, United States ...	120	+ 14
Other wireless apparatus—		
Total	112	− 60
From United Kingdom ...	20	− 2
,, Germany	2	− 1
,, Holland	9	− 14
,, United States ...	71	− 43
Other telegraph and telephone apparatus—		
Total	69	− 84
From United Kingdom ...	40	− 41
,, Belgium	8	− 33
,, Sweden	14	+ 10
,, United States ...	6	− 17
Other electrical apparatus (duty free)—		
Total	405	− 334
From United Kingdom ...	327	− 213
,, Canada	5	− 15
,, Germany	7	− 5
,, Sweden	51	+ 25
,, Switzerland	4	− 11
,, United States ...	49	− 114
Other electrical apparatus (dutiable)—		
Total	68	− 67
From United Kingdom ...	39	− 21
,, Canada	4	− 8
,, Germany	4	− 3
,, Holland	1	− 2
,, United States ...	10	− 31

American Domestic Appliance Exports

The general trade depression has so far this year had a further disastrous effect on the overseas demand for American domestic electrical appliances. The appended table shows the exports of such goods from the United States during the six months ended with June last as compared with the corresponding half of 1931, from which it will be seen there was a decline of £773,499, or about 59 per cent. :—

	January–June. 1931. Value £.	1932. Value £.
Fans	54,442	30,792
Household refrigerators	910,166	403,830
Washing machines	102,322	32,503
Irons	22,442	13,531
Cooking ranges	51.765	12,131
Vacuum cleaners	124,922	51,743
Other appliances	74,923	23,953
Totals	£1,340,982	£567,483

Brazil's Electrical Imports

The following statement, based on the recently issued foreign trade returns of Brazil, shows the value of the imports into that country of electrical goods last year, with a note of the decreases as compared with 1930 :—

	1931. Thous. £.	Decrease as compared with 1930. Thous. £.
Uninsulated copper wire (electric)... ...	2	− 8
Insulated copper wire	19	− 61
Electric cables	50	−206
Radio apparatus and accessories	103	− 20
Electric lighting and power plant	440	−748
Lighting carbons	9	− 6
Dynamos and generators	49	−102
Electric irons	2	− 2
Lamps...	72	− 73
Motors	56	−120
Transformers	46	−228
Insulators	11	− 49

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

The Club Movement

A number of letters appeared in the Electrical Review in August and September with reference to a suggested club for electrical men. Efforts made by those who introduced the matter—the proposal was first advanced by Mr. R. N. Pegg in our issue of August 12th—have not been conspicuously successful up to date, but certain clubs are placing their accommodation and facilities at the disposal of electrical engineers who desire to avail themselves of them.

To-day we publish a letter in our Correspondence pages from the Freemasons' Club, London, and last week, it will be remembered, the United Engineers' Club, Ltd., wrote describing certain steps that had been taken to meet the want. It may interest readers to know that the United Engineers' Club, Ltd., was registered at Somerset House on September 12th, that is a few days after the publication of the letter from Mr. F. J. Collis, one of the founder-members of the late Engineers' Club (London), which appeared in our issue of September 9th. The capital of the company is £1,000 in £1 shares. Its purposes are "to promote, manage, and carry on social clubs in Great Britain or elsewhere, and to carry on business as hotel, restaurant, and café keepers, licensed victuallers, caterers, &c." The company is a "private" one, and the directors are: Dargan Casebourne, Greatham House, Sandal Road, New Malden, Surrey, insurance agent; and William Rinman, 11, Upper Addison Gardens, W.14, engineer. No list of shareholders or allottees has been filed, but each of these directors signed the memorandum of association for 500 shares (thus absorbing the whole nominal capital). Mr. Harold C. T. Vince is the first secretary, and the registered office is at 46, Grosvenor Gardens, S.W.1.

Emergency Lighting Installations

The two serious failures of the electricity supply in London on Monday bring home emphatically the necessity for emergency lighting installations in hospitals and places of entertainment. A number of cinemas have recently been equipped with the "Keepalite" emergency lighting system, in particular the Regal, Lichfield, the Broadway, Eccles, the Gaumont Palace, Wolverhampton, the Regal, Paignton, and the Regal, Camberley. This system was introduced by the Chloride Electrical Storage Co., Ltd., three years ago, and it is now installed in more than 150 cinemas throughout the country.

The Torquay Exhibition

The Mayor of Torquay officially opened at the Town Hall on October 10th an exhibition of electrical equipment organised by the Corporation Electricity Department. Mr. G. J. Hollyer, borough electrical engineer, in introducing the Mayor, said that this was the second show of its kind, and while most of the apparatus displayed was of domestic application, there was also machinery of a semi-industrial type, which would interest members of the Hotels' and Caterers' Association, which was holding its conference in Torquay. The Mayor (Mr. F. Callard) said that the Electricity Commissioners had entrusted the Corporation with the electrification of 435 sq. miles, having a population of 100,000, many of whom had yet to learn of the advantages of electricity for purposes other than lighting.

A G.E.C. display at the Torquay Exhibition

Admission to the exhibition, which closed on Saturday last, was free. There was a comprehensive range of electrical appliances, special attention being paid to cooking. A feature was the latest types of domestic electrical apparatus for use in hotels and similar establishments, of which there is a large number in Torquay. On each day of the exhibition a lucky number programme entitling the holder to a prize was issued, and six electric irons were presented to those who most nearly guessed the number of people who visited the exhibition. The attendance for the six days totalled 19,053. During the week the Town Hall was floodlighted and illuminated with coloured lights.

Vacuum Cleaner Brush Replacement

For speedy service in the replacement of brushes for vacuum cleaner motors, electrical contractors will appreciate a new showcard just available from Star Electro Carbons, which provides in handy packets brushes for nineteen of the most popular makes of machine. Above each pocket are the price and name of the appropriate cleaner.

A Falk, Stadelmann Window Display

The accompanying illustration shows an attractive window display which has been prepared by Messrs. Falk, Stadelmann and Co., Ltd., for electrical traders. It shows "Efesca" fires, a vacuum cleaner and other domestic appliances marketed by the company, which is prepared to arrange this display for any electrical dealer.

An "Efesca" window display

The Wellington Electrical Exhibition

An electrical exhibition, held under the auspices of the West Midlands Joint Electricity Authority, will be opened on Monday next, at the Baths Hall, Wellington. The exhibition will cover appliances and apparatus for the home, shop, factory and farm. During the week cooking and other demonstrations will be given, while arrangements have been made for visits of students from local colleges and schools. The J.E.A. will have an information bureau for the use of wiring contractors. Among the exhibitors will be the following:—Belling & Co.; Berry's Electric, Ltd.; Revo Electric, Co., Ltd.; General Electric Co., Ltd.; Hotpoint Electric Appliance Co., Ltd., Ferranti, Ltd.; British Vacuum Cleaner Co., Ltd.; British Thomson-Houston Co., Ltd.; J. Shaw & Sons (Wolverhampton), Ltd., and Santon, Ltd.

New Showrooms for Hemel Hempstead

The Watford Town Council has adopted a scheme for the provision of showrooms, a demonstration room and offices for the electricity undertaking at Hemel Hempstead, at an estimated cost of £5,000. Inquiries are also to be made with a view to acquisition of a site for the provision of electricity showrooms at Watford.

New Instrument Showrooms

The Foster Instrument Co. has opened a London demonstration room at 74, Victoria Street, S.W.1, where a complete range of industrial and research instruments comprising thermo-couple, optical and radiation pyrometers, and also electrical distance thermometers will be available, together with a working demonstration of automatic temperature controllers. The exhibit will be managed by Messrs. Mangin, Davson & Partners, Ltd., who will have an experienced engineer in attendance to advise on temperature measurement and control problems.

The Dorking Electrical Exhibition

An electrical display was arranged during last week's Trades Exhibition at Dorking under the auspices of the London and Home Counties Joint Electricity Authority and local registered contractors. There was a varied display of all electrical appliances for use in the home, to which the following contractors contributed: Mr. J. E. J. Goundry and Messrs. Tamplin & Makovski (Reigate), Messrs. Buchanan & Curwen, Ltd. (Leatherhead), Overhead, Ltd. (Dorking), and Messrs. E. T. Turner (Epsom). The General

Electric Co., Ltd., and Berry's Electric, Ltd., also had excellent displays. Amongst the many appliances exhibited by Messrs. Buchanan & Curwen, Ltd., were water heaters, radiators, artificial sunlight apparatus, anti-burglar lighting, &c. The company also arranged an electrically equipped bedroom.

B.T.-H. Employés Gift to a Hospital

On October 8th the Princess Royal opened at the Hospital of St. Cross, Rugby, a new sun pavilion presented by the workpeople of the British Thomson-Houston Co.'s Rugby Works.

New London Neon Signs

The accompanying illustration shows the façade of the Stoll Picture Theatre, Kingsway, W.C.2, which now bears what is claimed to be the largest electric theatre sign in Great Britain. About 4,000 ft. of neon tubing and twenty-five miles of wire were used in its construction. The firm responsible for the work was Neon Installations.

The Franco British Electrical Co., Ltd., has recently installed a well-executed blue neon sign on gilt letters over the entrance to the Ritz Restaurant, Piccadilly, W.1.

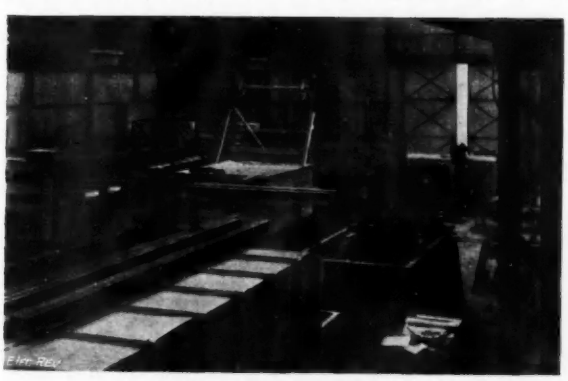
An " Exide " Luncheon

The Chloride Electrical Storage Co., Ltd., gave its customary luncheon in connection with the Motor Show on October 13th and, as usual, Mr. D. P. Dunne, the managing director, presided. Mr. Dunne said that in spite of the international depression the sales of the company's batteries had continued to advance and the " Drydex " batteries, in particular, had gone ahead phenomenally. The national grid far from adversely affecting their sales had provided a stimulus and the company's " Keepalite " system was developing extensively. At the risk of being called a pessimist, he said that he could not see any signs of an improvement in the situation; indeed, there could be no improvement until the existing ultra-nationalistic sentiment was abandoned. Referring to the Ottawa agreements Mr. Dunne said that he hoped the electrical industry as a whole would secure more from them than the battery makers were likely to get. Canada had agreed to allow into the country free of duty accumulators with plates exceeding in dimension 14 in. by 11 in. by ¾ in. thick; such accumulators were rare.

The Stoll Picture Theatre outlined in neon tubing

Electric Furnaces for Russia

Birmingham Electric Furnaces, Ltd., is working on a contract for electric heat treatment furnaces valued at over £30,000. The furnaces are for installation in a large Russian factory. A year ago an order was carried out for the supply of thirty-seven furnaces at a cost of £15,000 for the tool room of the same factory. The present contract will bring the total number of furnaces supplied up to fifty-six. Those in the course of manufacture at the moment are mostly of the continuous conveyor type, with either chain, belt or roller hearth conveyors. They are to be used for hardening, tempering and carburising operations on tractor parts. Most of them are of a type which have not yet been used on a big scale in this country, but it is understood that similar plant will shortly be introduced by a large firm of automobile manufacturers in England. The total load of the furnaces which have been supplied already or are in course of manufacture is about 2,750 kW, the largest single rating being 300 kW.



Packing furnaces for Russia

Our Domestic Special Issue

In the handling of such a mass of matter as we collected for our last week's Domestic Special Issue it was inevitable that slips should occur here and there.

For instance, we described a " Dolphin " fire—the " Townsend "—made by Domestic Electrification, Ltd., as " An elegant Xcel " (p. 536). On p. 540 the inscription for the " Magnet " thermal storage cooker (left) was made to cover also the " Carronette " (Carron Company) cooker on the right. The name of the vibro-massage set on p. 552 is " Magnet," not " Osram," and the switch-plug on p. 566 is a product of the Wandsworth Manufacturing Co., Ltd.

The correct dimensions of the oven of the Jackson Electric Stove Co.'s No. 91J cooker are: height 10¾ in., width 13¾ in., and depth 13¾ in.; and " No. 62 " cooker oven measures 12 in. high by 13¾ in. wide by 13 in. deep.

Messrs. Wm. McGeoch & Co., Ltd., were inadvertently omitted from the index to manufacturers (pp. 569 and 570), while the address of the Stanley Electrical Co. should have been Latimer Works, Teddington, Middlesex.

The heating and lighting unit illustrated on p. 534 as made by Messrs. Berkeley & Young, Ltd., is the " Morganite " unit of Messrs. Barker, Young & Co., Ltd.

Social Events

The " Clesco " Light Operatic and Dramatic Club of the County of London Electric Supply Co., Ltd., is presenting " Adam's Apple," an original farce, on October 27th and 28th at 7.45 p.m. at King George's Hall, Caroline Street, Tottenham Court Road, W.C. Tickets can be obtained from the hon. secretary, Mr. C. C. Thatcher, County House, 46/47, New Broad Street, E.C.

The Leeds Electrical Club is holding a dinner-dance at the Hotel Metropole, Leeds, on November 18th, at 7.30 p.m. Tickets (8s. 6d.) can be obtained from Mr. E. G. Sellers, hon. secretary, Welsbach House, Park Place, Leeds.

Royal Visits

H.R.H. Prince George attended the North London Exhibition at Alexandra Palace last Saturday, when he visited the Northmet Exhibit. He was shown a new electric sign, the " Rite-a-Lite," manufactured by Utilities Speciality, Ltd., which reproduces in colour any mark made thereon by a coloured crayon. The sign contained the words " Let the Northmet Company Solve your Electrical Problems," and Prince George signed it.

On October 12th the Duke of York inspected the Bridgeton Works of Messrs. Mavor & Coulson, Ltd. The Duke is president of the Industrial Welfare Society, of the Council of which Mr. Sam Mavor was an original member. After being welcomed by the directors, the Duke saw the new commercial and drawing offices, and the heads of departments were presented to him. He then visited the various sections of the works, inspecting the company's coal cutters, foundries, and Welfare Department.

On October 11th the Prince of Wales and Prince George, accompanied by the Swedish Crown Prince, visited the " SKF " ball-bearing factory in Gothenburg. The royal guests were received by the president of the board, Mr. Axel Carlander, and two directors, Messrs. B. G. Prytz and Uno Forsberg.

A Mystery Elucidated

Many readers will have been puzzled by an advertisement which has appeared in one or two recent issues in which Messrs. Donovan & Co., of Birmingham, have apparently offered " white enamelled " cables for sale. The explanation is that our printers substituted " British Made Cables " for the correct heading—" Bathroom Fittings "—with strange results.

Trade Announcements

Electrical & Engineering Products, Ltd., Coastal Chambers, 172, Buckingham Palace Road, S.W.1, have recently secured

the agency for the sale in London and the South of England of the complete range of mains products manufactured by G. P. Cosway, Ltd., of Nuneaton.

Messrs. Fred Dawson & Co., Ltd., have opened a branch office and stores at 31, Spring Bank, Hull. Large stocks of lighting and power accessories, radio equipment, &c., will be maintained under the supervision of Mr. H. Bray. The company is the main district distributor for the Fuller Accumulator Co., Ltd.

Messrs. John Irving & Sons, Ltd., electrical contractors, Glasgow, have opened a branch at 10-12, St. Andrew's Street, Dumfries.

Floodlighting of Lilleshall Abbey

With a view to demonstrating the possibilities of electricity to the consumers of the district, the West Midlands Joint Electricity Authority, in conjunction with the Edison Swan Electric Co., Ltd., and Abel & Smith's Electrical Co., Ltd., of Bridgnorth, have arranged a special floodlighting display of Lilleshall Abbey, Newport, Salop. The historic ruins, which were recently visited by archæologists and diviners in order to discover a secret passage, will be floodlighted for three weeks. Twenty 1-kW floodlighting units were employed and a green coloured screen over the lamp that illuminated the crypt was very effective. Certain other lamps had colour screens of terra cotta, giving a warm effect. Extensive illuminations were also arranged in the grounds of Lilleshall Hall.

A Birmingham Electrical Exhibit

At the Empire Pageant of Food and Health and Home Exhibition, Birmingham, which closes to-morrow (Saturday), the Birmingham Corporation Electric Supply Department has a large stand on which it is displaying a varied selection of domestic electrical appliances, while cookery demonstrations

A domestic appliance display by the Birmingham Electric Supply Department

are being given daily. A portion of the Department's stand is shown in the accompanying illustration.

A Polish Electrical Syndicate

A syndicate for small electrical appliances, such as fittings, switches, contacts, &c., has just been formed by four large concerns. It is intended to establish a central sales organisation in Warsaw.

The Copenhagen Exhibition

It is reported that the estimated number of visitors to the British Exhibition at Copenhagen, which closed on October 9th, was 400,000, and that orders for goods to the value of approximately £1,000,000 were received.

For Sale

Mr. Henry J. Shaw is to sell by auction at 13, High Holborn, W.C.1, on November 2nd electrical goods and materials for lighting, heating and power.

(See our advertisement pages to-day.)

The E.D.A. October Programme

The sales and publicity programme of the British Electrical Development Association for October draws attention to the Hotel Lighting and Heating Campaigns in which the Association will be especially active during October and November. A preliminary announcement is made regarding the two E.D.A. calendars for 1933. The window displays for the month embrace electric fires and artificial sunlight apparatus. Illustrations of two posters are reproduced, and a price list of literature for the month is given. A list of forthcoming salesmanship conferences in London and the Provinces is also included.

Catalogues Required

Messrs. Hill & Bailey, who have commenced business as electrical and mechanical engineers and contractors at 29a, Lion Street, Blackley, Manchester, ask for manufacturers' lists and catalogues.

The Electricity Supply Rifle League

The results of September matches of the 3rd division of the Electricity Supply Rifle League were as follows:—City "C" 567 v. St. James' "B" 546; Brimsdown 573, City "C" 567; Barking 567 and 572, St. James' "B" 548 and 552; Barking 569, Brimsdown 561; Hackney 555, St. James' "B" 543; Hackney 551, L.P. Co. "C" 549. City "C" heads the league with 14 points, Barking being second with 13 points.

Scottish Radio Exhibition

The third Scottish Radio Exhibition opened in the Waverley Market, Edinburgh, on October 12th. An interesting newcomer to the exhibition is the Post Office Engineering Department with a stand on which are demonstrated the methods which may be employed to eliminate interference caused by industrial and domestic electrical machinery. The Gramophone Co. has a special exhibit which includes a £300 "not for sale" model. Spensers (Scotland) show the "Tannoy" radio-gramophone. Philips sets are also prominent. An innovation has been introduced by the General Electric Co., Ltd. Apart from its stand the company has set up a portable sound-proof demonstration hall capable of accommodating 100 persons. Radiovision, Ltd., has an excellent display of the products of Texado Radio and Electric, Ltd., for which it is the Scottish distributor. L. McMichael, Ltd., show a new range of duplex receivers, while the Ferranti electric clock for fitting into the front panel of an a.c. mains radio receiver is among exhibits shown by Henry Tatton & Son.

The exhibition was opened by Dr. M. J. Rendall, one of the Governors of the B.B.C., others present including Mr. L. McMichael, chairman of the Radio Manufacturers' Association, Mr. A. Steuart, president of the Scottish Radio Retailers' Association, and Mr. D. Cleghorn Thomson, Scottish regional director of the B.B.C.

Price Reduction

The Belgrave Electric Co. announces a reduction in prices of "Belgrave" gasfilled lamps.

German Electrical Imports and Exports

The imports of electrical machinery and apparatus into Germany during the seven months ended with July last were valued at £692,250, as compared with £1,077,650 in the corresponding period of 1931. The exports of similar material from Germany during the seven months amounted to £9,867,200, as compared with £13,681,600. The import total was made up of £103,000 of electrical machinery, and parts and apparatus £589,950. The respective figures for the exports were £2,488,450 and £7,378,750.

Czecho-Slovakian Electrical Imports

The value of imports of electrical machinery and apparatus into Czecho-Slovakia during August last amounted to 14,152,000 crowns, bringing the total for the first eight months of the current year to 130,692,000 crowns.

The Lead Market

Messrs. James Forster & Co., reporting on the lead market, state that there is no change in the general position. Imports during September were only 15,891 tons against 21,997 tons in August, while exports amounted to 549 tons, leaving 15,342 tons for home consumption.

Prices of Materials

Messrs. F. Smith & Co. report, October 19th:—No change in the prices of silicium bronze wire and electrolytic copper.

Messrs. Edward Till & Co. report, October 19th: India-rubber, Para fine, 5d., ½d. dec.

Messrs. James & Shakespeare report, October 19th: Copper bars (best selected), sheet and rod, £65, £3 dec.; English pig lead, £13 5s., 10s. dec.

New Catalogues and Lists

W. Canning & Co., Ltd., Great Hampton Street, Birmingham.—An illustrated catalogue of automatic polishing equipment.

Siemens Electric Lamps & Supplies, Ltd., 38-39, Upper Thames Street, E.C.4.—A booklet entitled "Light on Electricity by Siemens," containing information on electric lamps and appliances, with useful hints for the consumer.

Zenith Electric Co., Ltd., Zenith Works, Villiers Road, Willesden Green, N.W.2.—Catalogue section 6, describing the new wire-wound "Vit-Bond" resistance units.

Rheostatic Co., Ltd., Slough.—A leaflet giving particulars of two new additions to the company's range of thermostats.

Philips Industrial, 145, Charing Cross Road, W.C.2.—Publication No. B.304, giving characteristic curves of the principal types of Philips regulator lamps. Also a leaflet (No. 270X-9-32) on a cooling pump for deep therapy valves.

Arora Co., Loughborough.—The new season's illustrated list of electric fires.

Edison Swan Electric Co., Ltd., 123-5, Queen Victoria Street, E.C.4.—Publications Nos. H.C. 809 and 812, relating to the extensive range of "Ediswan" fires.

Morse Chain Co., Ltd., Letchworth, Herts.—Catalogue No. M.L. 1032, giving information regarding the design, application and construction of "Morse" chain drives.

L. G. Hawkins & Co., Ltd., 35, Drury Lane, W.C.2.—A broadsheet relating to "Tricity" electric fires, the distribution of which the company has recently taken over. Also the October issue of the "Link."

J. A. Crabtree & Co., Ltd., Lincoln Works, Walsall.—A price list (No. 149) of electrical accessories and ironclad gear. A new range of cooker control units is being introduced.

Northern Steel & Hardware Co., Ltd., 1 and 3, Southgate, Deansgate, Manchester.—A 164-page wholesale radio catalogue for the 1932-33 season.

British Insulated Cables, Ltd., Prescot, Lancs.—Catalogues C.1.F. and C.2.R., dealing respectively with "B.I." joint boxes and copper and aluminium wires, &c.

Mayall & Co., Ltd., 61, Moor Street, Birmingham.—A leaflet illustrating and describing the new "Mayall" fire.

Electric Machinery Co., 28, New Union Street, Ancoats, Manchester.—A folder describing the "Rightway" ten-ton pulley and wheel drawer.

Evershed & Vignoles, Ltd., Acton Lane Works, Chiswick, W.4.—List No. 254, priced and illustrated, descriptive of a new "Meg" type combined insulation and sheathing continuity tester for wiring installations.

D. M. Lumsden, Millburn, Almondbank, Perth.—An illustrated and priced catalogue (No. 30) of quartz mercury-vapour lamps.

F. V. Williams & Co., Dover House, Westminster Bridge Road, S.E.1.—An illustrated leaflet giving full particulars of the company's d.c. and a.c. propeller fans.

Fredk. J. Gordon & Co., Ltd., 92, Charlotte Street, W.1.—A list illustrating and describing battery shop tools. A new type of post nippers is now available.

Premier Electric Heaters, Ltd., Keeley Street and St. Andrew's Road, Birmingham.—The company's new fire list, containing details of the new "Grafton" imitation coal fire.

Electric Depôt, Ltd., Pritchett Street, Aston, Birmingham.—A leaflet dealing with steel frame cable hangers for armoured cables.

Metropolitan-Vickers Electrical Co., Ltd., Trafford Works, Manchester.—New and revised leaflets for insertion in the company's sectionalised catalogue. The subjects dealt with are motors, control gear, and switchgear.

R. R. Beard, Ltd., 10, Trafalgar Road, Old Kent Road, S.E.15.—An illustrated catalogue of lighting apparatus for theatres, cinemas, studios, and dance halls.

Veritys, Ltd., Aston, Birmingham.—Catalogues dealing with "Maxlume" industrial lighting equipment (No. 1106) and fires (No. 1107).

Drake & Gorham Wholesale, Ltd., 77, Long Acre, W.C.2.—Pamphlet No. 514 containing illustrations, prices and particulars of fires, radiators, water heaters, and other domestic appliances. The cover bears a humorous drawing.

Switchgear & Cowans, Ltd., Elsinore Road, Old Trafford, Manchester.—An illustrated brochure drawing attention to the various features of internal isolation switchgear.

Provincial Incandescent Fittings Co., Ltd., Pifco House, High Street, Manchester.—A six-page folder of "Pifco" patent radiometers and electrometers.

Berkeley & Young, Ltd., Tyseley, Birmingham.—An illustrated folder, printed in colour, dealing with electric fires, toasters, irons, &c.

London Electric Firm, Brighton Road, South Croydon.—A leaflet illustrating revolving searchlights supplied to a Midland town for carnival illuminations, &c.

Kandem Electrical, Ltd., 711 & 715, Fulham Road, S.W.6.—Lists Nos. F10231a and 1228d, referring respectively to Kandem indoor lighting fittings, and floodlight projectors. Illustrated and priced.

Electro Dynamic Construction Co., Ltd.—A descriptive pamphlet, illustrated and priced, of a new phase advancer.

Schall & Son, Ltd., 75, New Cavendish Street W.1.—Bulletin No. 1018, describing, with illustrations, X-ray screening stands.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, E.C.—A brochure issued as the twenty-first birthday souvenir of the Henley wiring system, which includes some excellent illustrations of famous buildings in which this wiring system has been installed.

Ever Ready Co. (Gt. Britain), Ltd., Hercules Place, Holloway, N.7.—A three-page folder, illustrated in colour, of motor-car and bicycle lamps. Priced.

Allen West & Co., Ltd., Brighton.—An attractive leaflet illustrating and describing the "SCO" automatic contactor starter.

Bankruptcy Proceedings

E. Gould, High Street, Lee-on-the-Solent, Hants, lately trading as electrical and radio engineer, as a general partner in the firm of Gould & Co., High Street, Lee-on-the-Solent, Hants.—The receiving order was made recently on the debtor's own petition. At a first meeting of creditors held recently at the Official Receiver's Office, 87, High Street, Portsmouth, a statement of affairs was presented which disclosed liabilities of £645, and assets of £112. The case being a summary one, was left in the hands of the Official Receiver as trustee.

F. R. A. Lock and **V. C. Lock** (trading as Lock Brothers), Union Street, Stourbridge, Worcestershire, electrical engineers.—The receiving order in this matter was made on the debtor's own petition. The first meeting of creditors was held recently at the Official Receiver's Office, 1, Priory Street, Dudley, when according to the statement of affairs filed there were liabilities of £321 and assets of £186. The case, being a summary one, was left in the hands of the Official Receiver as trustee.

F. O. Tosswill, 60, Wodeland Avenue, Guildford, Surrey, late 15, Portsmouth Road, Guildford, electrical engineer. This debtor's public examination was held recently at the Guildhall, Guildford. According to the statement of affairs, the liabilities amounted to £967, whilst the assets were estimated to realise £459. Replying to the Official Receiver, debtor said that he commenced business on his own account in July, 1928, with a capital of £200, at premises in Portsmouth Road, Guildford. In 1929 he removed to 15, Portsmouth Road, and at that time his father gave him £100 to put into the business. About that time the Guildford Corporation opened a showroom, which had a damaging effect on his trade. In June this year the premises were closed owing to a distress for rent being levied, and in July debtor executed a deed of assignment. He attributed his failure to insufficient profits to cover overhead charges and competition by municipal trading. The examination was adjourned for closing.

A. J. Brookes, electrical contractor, 36, North End Road, Golders Green, N.—This debtor attended on October 12th before Mr. Registrar Warmington at the London Bankruptcy Court for public examination upon accounts showing liabilities of £1,698 against assets of £78. He attributed his failure and insolvency to lack of capital, losses on and of contracts, bad debts, general trade depression, restriction of credit, and a loss of stock by flood. The examination was concluded.

L. G. H. Cantle, wireless engineer, Woodbury Cottage, Woodland Grove, Oatlands Park, Weybridge.—The public examination was held recently at Kingston, Surrey. A statement of affairs disclosed gross liabilities of £2,505, of which £636 was expected to rank for dividend, while assets were estimated to realise £1,131, so that there was a surplus on paper of £495. The debtor attributed his position to a judgment obtained against him consequent upon a motor-car accident. The examination was adjourned.

T. E. F. Spencer, radio dealer, 24, Nicholls Street, West Bromwich.—First meeting, October 21st, at the Official Receiver's Office, 159, Great Charles Street, Birmingham. Public examination, October 28th, at the Law Courts, Lombard Street West, West Bromwich.

J. Glickman (Manchester Radio Service Co.), wireless factor, 10, 12 & 14, Great Ducie Street, Strangeways, Manchester.—Discharge suspended for two years until September 12th, 1934.

T. H. C. Hughes, electrical and wireless engineer, 1090, Manchester Road, Bradford.—First and final dividend of 3s. 11½d. in the £, payable October 18th, at the Official Receiver's Office, 71, Manningham Lane, Bradford.

W. J. Holyoake, electrical engineer, 2, Scott's Mansions, Claremont Hill, Shrewsbury.—Last day for receiving proofs for dividend, October 26th. Trustee, Mr. P. M. Milward, 22, Swan Hill, Shrewsbury, Official Receiver.

L. T. H. Greig (trading with another as Yeoman & Greig), electrical goods agent, 4, North End Road, Golders Green, N.W.—This bankrupt, who failed last January, applied on Tuesday at the London Bankruptcy Court for an order of discharge. The Official Receiver reported that proofs of debt amounting to £646 had been received, and the assets would realise £52. The bankrupt was employed by Rus-Sun Ray, Ltd., until March, 1931, when he and Yeoman began business in partnership to exploit a medical lamp manufactured by the company who were the petitioning creditors. He attributed his position to loss of £300 which he borrowed and put into the firm as capital. The discharge was suspended for one month.

T. H. D. Pope, electrical engineer, 119, Commercial Road, Swindon, and 10, Regent Circus, Swindon.—The first meeting of creditors took place at the County Court Buildings, Swindon, on October 17th. A statement of affairs disclosed gross liabilities of £2,058, of which £1,146 was due to fully secured creditors. The unsecured liabilities amounted to £875, whilst the assets were estimated to realise £695, leaving a deficiency of £180. The failure was attributed to loss of trade due to premises being closed during reconstruction after a fire and loss of custom owing to unemployment.

F. G. Simcock, electrician, "Ferndale," Balcarres Road, Leyland.—Receiving order made October 10th on debtor's own petition.

G. E. Palmer, 1, Two Mile Hill, St. George, Bristol, wireless and electrical dealer.—The public examination was held at the Guildhall, Bristol, on October 7th. According to the statement of affairs the liabilities amounted to £942, whilst the assets were estimated to realise £288. Debtor attributed his failure to lack of capital, business inexperience, and bad trade. The examination was closed.

Company Liquidations

Victory Valves, Ltd., Manchester.—The statutory meeting of creditors was held on October 17th at the offices of Messrs. E. A. Radford, Edwards & Co., 76, Cross Street, Manchester. The statement of affairs submitted showed ranking liabilities of £22,961, all due to unsecured creditors. In addition, there were fully secured creditors for £638. The net assets were £5,622, leaving a deficiency so far as the creditors were concerned of £17,339. Resolutions were passed confirming the voluntary liquidation of the company, with Mr. J. W. Shepherd, 78, King Street, Manchester, as liquidator, with a committee. It was stated that negotiations were taking place with a view to interesting valve manufacturers in different countries in the company's patent rights.

Coley & Swinnerton, Ltd.—Winding-up voluntarily. Liquidator, Mr. A. S. Drinkwater, 1, Newhall Street, Birmingham.

J. Ward & Co., Ltd.—Winding up voluntarily.—Liquidator, Mr. C. E. Rogerson, 12, York Street, Manchester.

Lectra Ray Products, Ltd.—Particulars of claims by November 30th to Mr. W. G. Wooldridge, Basildon House, Moorgate, E.C., joint liquidator.

Rotor Signs (England), Ltd.—Meetings, November 14th, at 4, Dove Court, Old Jewry, E.C., to receive an account of the winding-up by the liquidator, Mr. B. T. Crew.

Bere Alston & District Electric Supply Co., Ltd.—Winding up voluntarily. Joint liquidators, Mr. J. H. Brown, Glany Caffyn, Bere Alston, and Mr. A. A. Gates (Christy Bros. & Co., Ltd.), Chelmsford.

Sinclair, Paget & Co., Ltd.—Winding up voluntarily. Liquidator, Mr. G. D. Florence, 91-93, Bishopsgate, E.C.

Ridgway Storage Battery Co., Ltd.—Meeting, November 16th, at 12, Clarence Street, Kingston-on-Thames, to receive an account of the winding-up by the liquidator, Mr. C. G. Graves.

Submersible Motors, Ltd.—Meeting, November 15th, at 58, Victoria Street, S.W., to receive an account of the winding-up by the liquidator, Mr. H. A. Allison.

Wholesale Wireless, Ltd., Sensitite Works, 124, Granville Road, Child's Hill, London, N.W.2, wireless dealers.—The statutory meeting of creditors was held recently at the offices of Messrs. Beecroft, Sons & Nicholson, 12, Wood Street, E.C.2, when a statement of affairs was submitted which disclosed liabilities of £1,432 and net assets of £605. It was decided that Mr. Wm. Nicholson should be appointed liquidator, with a committee of inspection. The following are creditors:—Edison Swan Electric Co., Ltd., £46; Magnavox (Gt. Britain), Ltd., £56; Telegraph Condenser Co., Ltd., £68; Wingrove & Rogers, Ltd., £60.

Private Arrangement

P. H. Manning, 165, Liverpool Road, Birkdale, electrical and wireless engineer.—A statement of affairs presented at a recent meeting of creditors showed liabilities of £702 and net assets of £140. It was reported that the debtor commenced business at his present address about four years ago. His father guaranteed the bank overdraft and also advanced him £125, which was paid as a deposit on the property which cost £925. The debtor had expended an additional £200 on the premises. The turnover had been small, whilst the drawings had never exceeded £3 per week. It was decided to confirm a deed of assignment already executed.

Electricity Supply

Lighting, Domestic, Power

Accrington.—INCREASED DISCOUNTS FOR PROMPT PAYMENT.—The Electricity Committee has decided to increase the discount on electricity accounts by an additional 5 per cent. if they are paid before a certain date. This will make the discount to large power users 20 per cent. and to other consumers 15 per cent.

Aylesbury.—LOAN SANCTIONED.—The Town Council has received sanction to a loan of £5,000 for domestic electrical apparatus.

Banchory.—ELECTRICITY FOR COUNCIL HOUSES.—The Town Council has decided to have electric lighting installed in the municipal houses if this can be done at a reasonable cost.

Bedford.—MAINS EXTENSION.—The Electricity Committee recommends the extension of mains at a cost of approximately £1,520.

Burnley.—THE CHANGE-OVER.—The Electricity Committee has applied for sanction to a loan of £20,000 in connection with the change-over from d.c. to a.c. in the Daneshouse district. This will bring the total spent so far to £90,000; the total cost of the change-over will eventually be £150,000.

Buxton.—SPECIAL ORDER.—The Corporation has applied to the Electricity Commissioners for a Special Order authorising it to extend its area of supply so as to include a further portion of the borough and parts of the parishes of Fernilee and Hartington-Upper-Quarter.

Campbeltown.—ELECTRICITY SUPPLY OFFER.—An offer to provide an electricity supply to the burgh is to be submitted shortly by a firm which contemplates the promotion of a Provisional Order seeking authority to supply Lochgilphead, Ardrishaig, Tarbert, and Campbeltown.

Carlisle.—MAINS EXTENSIONS.—The borough electrical engineer has been instructed to carry out mains extensions costing about £2,000.

LOANS.—Application is to be made for sanction to loans of £5,000 for an assisted wiring scheme and £5,000 for meters.

Castle Ward (Northumberland).—EXTENSIONS.—The Newcastle and District Electric Lighting Co., Ltd., is to supply electricity to houses on the fringe of the Westerhope and Heddon-on-the-Wall district.

Cheltenham.—THE HIRE-PURCHASE SCHEME.—At the October meeting of the Town Council it was complained that local contractors were not doing all they might for the hire-purchase scheme of the Electricity Department. The slow progress is attributed by the contractors to the Council's insistence that one power plug should be put in for four lights, and in order to remove this grievance the Electricity Committee is prepared to alter its requirement. If better results do not follow this arrangement, the Electricity Committee states that it will take the matter into its own hands, and do the work itself wherever it can.

LOAN SANCTIONED.—The Electricity Committee has received sanction to a loan of £1,247 for the supply of electricity to Staverton, Boddington and Uckington.

REDUCED WASH BOILER CHARGES.—The charge for the hire of wash boilers has been reduced from 5s. to 3s. per quarter.

ILLUMINATION OF TOWN HALL.—A scheme has been approved for the outside illumination of the Town Hall at a cost of £240.

Chenies (Bucks).—SUPPLY INAUGURATED.—A supply of electricity was switched on last Saturday.

Colchester.—EXTENSIONS.—The Town Council has received sanction to a loan of £42,000 on account of an application for £93,000 for electricity extensions. The balance of £51,000 will be sanctioned on receipt of further information required by the Commissioners.

SUPPLY TO HOUSING ESTATE.—The Council has decided to provide a supply of electricity to Jaywick Sands Estate at an estimated cost of £3,125.

Continental.—FRANCE.—The Société des Forces Motrices de Bonne et Drac, of Lyons, has recently secured a concession to establish a hydro-electric station to utilise three waterfalls on the River Drac in the Isère and Upper Alps Departments. It is estimated that a total of 118,200 kW is available.

Dartford.—THE WIRING OF SMALL HOUSES.—The Electricity Committee recommends the adoption of a scheme whereby the Council will wire small properties under the following conditions: (1) The consumer to pay 2d. per kWh in excess of the prevailing ordinary rates until the cost of the installation is defrayed; (2) the maximum number of points to be four; (3) the landlord not to be called upon to accept the tenant's liability, under agreement; (4) the landlord to agree on behalf of himself and the owner for the time being of the freehold, that the installation is the property of the Council until the cost incurred by the Council has been discharged; (5) payments to be made for electricity supplied through prepayment meter, with a minimum annual payment of 12s. for the installation supplied. It is proposed to review the operation of the scheme at the end of twelve months.

Dornoch.—SUPPLY ARRANGEMENTS.—The Ross-shire Electric Supply Co., Ltd., is to lay two h.p. submarine cables across the Meikle Ferry to give a supply to the town.

Dumfries.—A NEW FLAT-RATE CHARGE.—Major Crabbe, convener of the Electricity Committee, reported, at a recent meeting of the County Council, on the progress of the electricity scheme, and stated that the Committee had adopted a new flat-rate charge for electricity in addition to the two-part tariff. This rate is to be 8d. per kWh for lighting, and 1½d. for heating, cooking, and domestic purposes. Up to the present, 155 miles of overhead h.p. lines have been erected and the cabling is almost complete. The contract for l.p. overhead work has been awarded to Callender's Cable & Construction Co., Ltd., and work will be started this month.

Ealing.—SHOWROOM LIGHTING.—The Electricity Committee recommends the floodlighting of the exterior of the showrooms, together with the provision of a colour lighting scheme for the interior.

East Westmorland.—APPEAL TO COMMISSIONERS.—The Council is to write to the Electricity Commissioners asking if they have a scheme before them for electrifying Westmorland, and if so, requesting them to expedite its progress.

Eccles.—DOMESTIC TARIFF REDUCED.—The fixed annual charge of the all-in tariff for domestic premises has been reduced from 20 per cent. on the rateable value to 15 per cent. for the first £60 of rateable value, and to 10 per cent. for over £60. The " unit " charge remains at ½d.

Fleetwood.—ABOLISHING THE SMOKE NUISANCE.—Officiating at a recent electrical exhibition organised by the Urban District Council, Councillor A. J. Priestley, chairman of the Council, said that 90 per cent. of the local dwellings and practically all the industrial concerns used electricity, thus enabling Fleetwood to abolish the smoke nuisance. The profit last year from the electricity undertaking was sufficient to contribute the equivalent of 3d. to the relief of rates. Councillor C. Saer, chairman of the Electricity Committee, said that the undertaking was also contributing the equivalent of a 1s. rate by way of reduced charges. Councillor Priestley explained that the electricity undertaking bought by the Council in 1910 for £17,800 had now a capital of £175,000, and it was hoped that the sales of electricity next year would reach 9,000,000 kWh. Consumers had increased from 720 in 1922 to 5,000.

Formby.—LOAN FOR ELECTRICAL DEVELOPMENT.—The Urban District Council has received sanction to a loan of £16,000 for the development of the electricity undertaking. Electric irons are to be hired out at 9d. per quarter each, and three-pint electric kettles at 1s. 3d. per quarter each.

Forres.—DELAY IN ELECTRICITY SCHEME.—The Town Council is to reconsider the question of the supply of electricity, owing to the delay in the Grampian Electricity Supply Co.'s scheme.

Glasgow.—MAINS EXTENSIONS.—The Electricity Committee has arranged to lay new distributing mains at an estimated cost of £3,509.

Hampshire and Surrey.—SPECIAL ORDER.—The Electricity Commissioners have submitted to the Ministry of Transport for confirmation a Special Order made by them authorising the Mid-Southern Utility Co. to supply electricity in parts of the rural districts of Alton, Basingstoke, Droxford, Winchester and Guildford.

Hastings.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains to the Belmont Estate (£345), the Gaiety Cinema (£140), Ochiltree Road (£83), St. Helens Road (£80), Guestling (£405), Fairlight (£442), Seddlescombe (£60), and Brede (£57).

High Wycombe.—SUPPLY TO DOWNLEY.—The High Wycombe (Borough) Electric Light & Power Co. has informed the Rural District Council that it had contemplated supplying Downley with electricity, but had found that the extension was more expensive than anticipated. The company has promised to canvass the village thoroughly and to go into the matter again next spring.

Hull.—BULK SUPPLY.—The Electricity Committee has obtained sanction to a loan of £8,850 in connection with a bulk supply to the South-East Yorkshire Light & Power Co., Ltd., for the Hornsea area.

India.—THE METTUR DAM.—The Mettur Dam, which is raised to 140 ft. above the river-bed level, is nearing completion. Already a huge lake has been formed, and it is estimated that the waterspread of the lake is nine sq. miles in extent. Two sets of irrigation sluices are built into the dam, known as the higher level and lower level sluices. The former consists of eight vents, 10½ ft. wide and 16 ft. high, and the latter of five vents, 7 ft. wide and 14 ft. high. It is proposed to generate power with at least a portion of the water required for irrigation. For this purpose four sests of pipes, each 8 ft. 6 in. in diameter, have been built into the dam towards the left flank. The water from the reservoir will enter the pipes by twin inlets, each of which will be provided with a screen. The pipes will operate with a head varying from 60 ft. to 160 ft., according to the storage in the reservoir, and each pipe will carry sufficient water to develop from 5,300 to 15,000 h.p. between these two heads. With an average of 125 ft. head the total h.p. developed would be 33,000. The Mettur project is estimated to cost about 74 million rupees, and is intended primarily to assure a supply to an irrigation area of a million acres.

Isle of Thanet.—SPECIAL ORDER.—The Electricity Commissioners have submitted to the Minister of Transport for confirmation a Special Order made by them authorising the South-

East Kent Electric Power Co., Ltd., to supply electricity in part of the rural district of the Isle of Thanet.

Kettering.—THE CHANGE-OVER.—The Electricity Committee has obtained sanction to the borrowing of £2,920 for the change of system of supply.

Lanark.—SUPPLY TO HOUSING ESTATE.—At a recent meeting of the Glasgow Corporation Gas Committee, the clerk to the Lanark County Council intimated that application had been made to the Council for permission to introduce electricity to the houses at the housing schemes at Eastfield and Farme Cross, Rutherglen, and Baillieston, which are at present lighted by gas supplied by the Glasgow Corporation. The Committee agreed that no objection should be taken to the proposal so far as the Gas Department was concerned.

Littlehampton.—INQUIRY.—The Electricity Commissioners are holding an inquiry on October 28th into the application of the Sussex Electricity Supply Co., Ltd., for the Littlehampton Electricity (Extension) Special Order. It is reported that the application will be opposed by the Urban District Council, the East Preston Rural District Council, and the Mid-Southern Utility Co.

Lochaber.—PROGRESS OF ELECTRICITY SCHEME.—Another stage in the progress of the Lochaber scheme was reached with the completion last week of the Laggan pressure tunnel, three miles long and more than 15 ft. in diameter, through which the waters of Loch Laggan and the Spean River will be turned into Loch Treig. To mark the event an informal ceremony took place last Saturday, in the course of which an explosive charge blowing out the last section of rock in the tunnel, was fired through the pressing of a button by Mrs. W. Murray Morrison, wife of the managing director of the British Aluminium Co., Ltd., the promoters of the Lochaber scheme. *The Times* states that the eventual result of the Lochaber development as planned will be the largest single hydro-electric power station possible in Great Britain, and will have an installed plant capacity of 130,000 h.p. The constructional work is being undertaken by Messrs. Balfour, Beattie, & Co., Ltd.

London.—FULHAM.—The Electricity Committee is to provide l.p. cables from Hurlingham Road to the High Street at a cost of £900.

SUPPLY FAILURES.—Two failures in the electricity supply occurred on Monday evening. At Islington a breakdown lasted for over half an hour, while the whole area covered by the Poplar Electricity Department was without supplies for about 45 minutes.

Macclesfield.—LATE SHOP-WINDOW LIGHTING.—The Electricity Co. of Macclesfield has reduced its charge for electricity for shop-window lighting after closing hours to 1½d. per kWh.

Manchester.—PROGRESS DURING JULY AND AUGUST.—During July and August the Electricity Department showed an increase of 4,684 kW in connections, bringing the total up to 510,921 kW. Applications for supplies, including additional supplies, numbered 3,878, representing a total of 6,372 kW. There were 271 new cookers connected, making a total of 10,253 now on circuit. Orders received for the hire of cookers amounted to 369. One new sub-station was put into commission, and additional plant was installed at four existing sub-stations.

STREET LIGHTING.—Some 135 new electric street lamps have been switched on in Droylsden urban district. About fifteen additional lamps are required to complete the present scheme as soon as road construction is sufficiently far advanced. A number of these lamps are installed on new roads which have not been previously provided with public lighting, but a considerable proportion are on main and town planning roads where obsolete gas lamps have been displaced. The schemes have been planned to comply generally with the requirements of B.S.S. 307.

Newcastle (Staffs).—A SUPPLY FOR MADELEY.—The Rural District Council has communicated with the North-West Midlands Joint Electricity Authority, with a view to securing a supply for Madeley.

Newcastle-upon-Tyne.—THE DUNSTON STATION.—Work is rapidly proceeding on the completion of the new £3,000,000 Dunston power station, and it will be officially opened on November 1st. Commercial supplies at the new 50-cycle frequency will probably be available within a fortnight of that date. The station has been in course of construction for two years and has provided work for 1,000 men. It will generate most of the electricity needed by Tyneside.

Paisley.—COMPENSATION FOR DISCHARGED EMPLOYÉS.—The Town Council has approved the Electricity Advisory Committee's reorganisation scheme by which an annual saving of £1,163 will be effected. Nine employés who will be dispensed with will receive compensation on the understanding that the recipients have no claim under the Electricity Supply Acts.

PREPAYMENT METERS.—The purchase of 200 additional prepayment meters has been approved by the Council.

Penrith.—POWER STATION EXTENSIONS.—The Urban District Council has passed plans submitted by the Penrith Electric Supply Co., Ltd., for additions to the electricity station in Friar Street, and by the Electricity Commissioners for the erection of a power house in Southend Road.

Rhyl.—LOAN.—Application is being made for sanction to a loan of £25,000 for mains, services, meters, &c.

Salop.—EXTENSIONS.—The North Wales Power Co., Ltd., is extending its line from Whitchurch to Prees and Wem, and the village of Tilstock is to be supplied.

Spalding.—LOANS.—The Urban District Council has applied for sanction to loans of £2,500 for the assisted wiring scheme, £1,000 for apparatus for hire, £1,500 for meters, and £5,000 for mains and services.

ASSISTED WIRING SCHEME.—The Council has approved a new scheme for assisted wiring, the purchase period to be ten years and the standing charge 1s. 3d. per week, plus 3d. per kWh.

Stewartry.—PURCHASE OF ELECTRICITY UNDERTAKINGS.—The Electricity Committee last week reported that a provisional agreement had been reached for taking over the Dalbeattie Electric Light & Power Co.'s undertakings in Dalbeattie and Gatehouse, and the County Council agreed that a formal offer should be made agreeing to purchase the undertakings for £14,500. In view of the proposed agreement, the Committee expressed the hope that Dalbeattie Town Council might withdraw its objections to the County Council's application for an Order. The Committee approved the draft agreement with the Central Electricity Board whereby the Council is to take electricity from the Board until a Special Order is obtained for the Stewartry. The Board is to provide, erect, and maintain single-circuit 11,000-V overhead lines between Tongland and Kirkcudbright, while the Council is to provide the necessary switchgear, transformers, connections, and other apparatus required for the control and distribution of the supply. The price to be paid is: Up to 250 kW, £4 per kW; from 251 to 500 kW, £3 10s.; above 500 kW, £3 5s.

EXTENSIVE DISTRIBUTION SCHEME.—The Council has also approved a distribution scheme estimated to cost £123,727.

Swansea.—THE TURBO-ALTERNATOR CONTRACT.—The Town Council has refused to accept the recommendation of the Electricity Committee for the placing of the contract for the turbo-alternators for the new super-power station at Tir John North and has decided to ask the Committee for a report giving the reasons for its recommendation. The recommendation was "that the 11,000-V scheme be adopted in preference to the 33,000-V scheme and that the tender of the English Electric Co., Ltd., at £133,644 be recommended for acceptance."

SUPPLY ARRANGEMENTS.—The Electricity Committee is to provide supply to Messrs. Weaver & Co., Ltd., at a cost of £4,497.

Warrington.—PUMPING EQUIPMENT.—The Water Committee has approved the provision of two electrically driven booster pumps, each capable of raising 180,000 gal. per hour, at an estimated cost of from £2,000 to £2,200.

Wainfleet.—PUBLIC LIGHTING.—The Parish Council has decided to enter into a yearly contract with the Mid-Linconshire Electricity Co. for public lighting.

Walsall.—SPECIAL ORDER.—The Corporation is applying to the Electricity Commissioners for a Special Order authorising it to extend its area of supply in the borough and in the parishes of Bentley and Great Barr.

Walton-on-Thames.—SUPPLIES IN THE ST. GEORGE'S HILL AREA.—The Electricity Committee is making arrangements with regard to the supply in the St. George's Hill area.

Washington (Co. Durham).—OIL LAMPS TO GO.—The Urban District Council has agreed to meet the local electricity company to discuss the question of substituting electricity for oil lamps in houses at Washington Staithes and Hillthorn, Usworth.

Weardale (Co. Durham).—ELECTRICITY CHARGES.—The Rural District Council has received a reply from the Cleveland & Durham Electric Power, Ltd., respecting its application for a reduction in electricity charges. The company states that the present charges are already very moderate for a sparsely populated area such as Weardale, and there is no prospect of a reduction to consumers in the area until the company is able to make a general reduction in all areas.

West Stanley (Co. Durham).—LOAN SANCTIONED.—Sanction to a loan of £898 in connection with the electricity undertaking has been received by the Urban District Council.

Whitby.—SPECIAL OUTDOOR LIGHTING TARIFF.—The Urban District Council has adopted a special tariff for outside lighting and illuminations during the summer quarters only at 6d. per kWh for the first 50 kWh per quarter, and 3d. per kWh beyond.

Whitley.—A SUPPLY FOR THE VILLAGE.—Work has been commenced by the Mersey Power Co. in connection with a supply of electricity for the village.

Wigan.—LOANS.—Application is being made by the Electricity Committee for sanction to borrow £20,000 for mains and £5,000 for domestic electrical appliances.

Willington (Co. Durham).—SUPPLY TO HOUSING ESTATE.—The Urban District Council is to ask Messrs. Straker & Love, colliery owners, if they are prepared to provide electricity to the Dene Estate. Letters have also been considered from the same company with reference to the Page Bank lighting scheme.

Wrotham.—SUPPLY ARRANGEMENTS.—The Urban District Council has made arrangements with the Kent Electric Power Co. for a supply of electricity for the district. The company is to extend its h.p. line, provide distributing cables in specified thoroughfares, and supply the Kemsing Road pumping station.

Traction

Algeria.—TROLLEY-BUSES.—A number of trolley-buses have been in use in Constantine for some time past, and so satisfactory have they proved that an order for two additional 40-seater vehicles has recently been placed with the Société Vetra, of Paris.

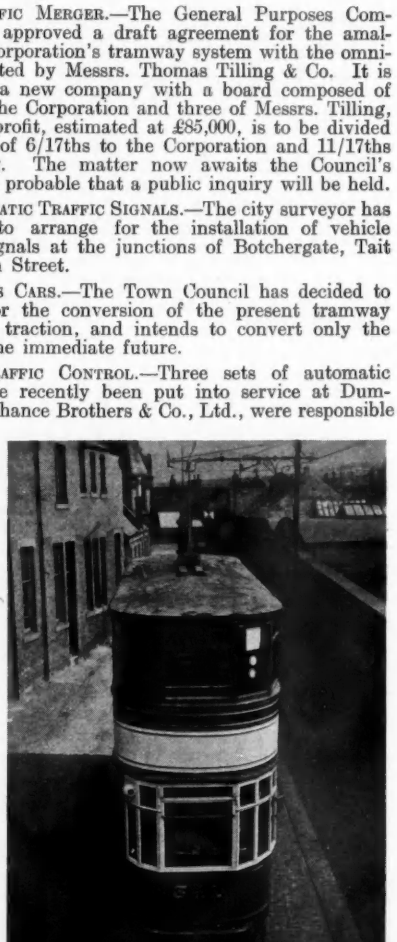
Brighton.—TRAFFIC MERGER.—The General Purposes Committee on Friday approved a draft agreement for the amalgamation of the Corporation's tramway system with the omnibus services operated by Messrs. Thomas Tilling & Co. It is proposed to form a new company with a board composed of two nominees of the Corporation and three of Messrs. Tilling, while the annual profit, estimated at £85,000, is to be divided in the proportion of 6/17ths to the Corporation and 11/17ths to Messrs. Tilling. The matter now awaits the Council's approval, and it is probable that a public inquiry will be held.

Carlisle.—AUTOMATIC TRAFFIC SIGNALS.—The city surveyor has been instructed to arrange for the installation of vehicle operated traffic signals at the junctions of Botchergate, Tait Street, and Crown Street.

Dover.—RAILLESS CARS.—The Town Council has decided to promote a Bill for the conversion of the present tramway system to railless traction, and intends to convert only the River branch in the immediate future.

Dumbarton.—TRAFFIC CONTROL.—Three sets of automatic traffic signals have recently been put into service at Dumbarton. Messrs. Chance Brothers & Co., Ltd., were responsible for their erection under the supervision of Mr. Jeffrey, the burgh surveyor.

Edinburgh.—TRAMWAYS AND RADIO RECEPTION.—With a view to minimising any possible disturbance to reception by radio sets near tramway routes, Mr. Fitzpayne, the transport manager, in conjunction with the Metropolitan - Vickers Electrical Co., Ltd., has evolved a specially designed choke coil for use on the trams. The first of these coils was fitted in the trolley circuit on the roof of the car illustrated in May this year, and shortly afterwards a second car was similarly equipped. Opinions differ as to the full extent of the improvement effected, and the Post Office Engineering Department has been invited by Mr. Fitzpayne to carry out definite tests on these cars.



One of the Edinburgh trams fitted with a choke coil designed to eliminate interference with radio reception

Middlesbrough.—RAILLESS CARS IN FAVOUR.—Members of the Tramways Committee have inspected the latest trolley-buses of the Teeside Railless Traction Board, and it is understood that the reports on the operation of the vehicles are so favourable that the introduction of a service in the town is likely to be considered.

Newcastle-upon-Tyne.—RAILCAR'S SUCCESSFUL OPERATION.—The Diesel-electric railcar "Tyneside Venturer," built by Sir W. G. Armstrong Whitworth & Co., Ltd., has completed six months' continuous service on a Newcastle branch of the London and North-Eastern Railway Co. During that time it has covered 25,000 miles at a cost of £87 and has been in service 17 hours daily. The railcar carries sixty passengers and travels at 65 m.p.h.

South Africa.—JOHANNESBURG.—Mr. L. M. Barry, manager of the municipal tramways, has reported to the Tramway and Lighting Committee that about £90,000 may have to be spent almost immediately on the rebuilding of tramcars, besides large sums in reconditioning the track, if the full service is to be maintained in perfect order. He recommends that the tramway services in the southern suburbs should be abandoned and replaced by motor-omnibuses or trolley-buses, the same fares to be charged as on the tramcars.

TROLLEY-BUS TRIALS TO BE MADE AT CAPETOWN.—Application has been made by the Capetown Tramways Co. for permission to extend its overhead trolley system for the purpose of carrying out tests with trolley-buses.

South Shields.—HIGH-SPEED MOTORS.—At a recent meeting of the Transport Committee, the manager stated that with the chairman he had recently visited the Bradford traction motor factory of the English Electric Co., Ltd., where the latest tramcar developments as regarded speed, reduction of weight, and savings which could be effected in the running charges were demonstrated to them. He stated the company had offered to supply control equipment comprising two 45-h.p. motors on the sale or return basis, and to rewind four of the existing motors for 25-h.p. operation. The company guaranteed a saving of £21 per car per annum by the use of its high-speed motor. The company's offer was accepted.

Sunderland.—RECONSTRUCTION OF TRACK.—The Town Council is to start work as soon as possible on the reconstruction of the tram track in Tatham Street.

Communications

Africa.—NEW RADIO STATION.—A new transmitting station for the African Broadcasting Company is to be erected by the Marconi Company near Capetown. It is expected to be in operation by the summer of next year.

Australia.—IMPROVING THE BROADCASTING SERVICE.—A sum of £50,000 is provided for in the Federal estimates for improvements in the national broadcasting service. It will be used for erecting new relay stations and improving the plant at the older stations. Two new ones will be erected almost immediately in Tasmania, where the one station in this State can only be heard within a short distance of Hobart. Professor Wallace, a member of the Broadcasting Commission, who is on his way to England, is entrusted with the mission of linking up the Australian organisation more closely with the British Broadcasting Corporation.

Austria.—SHIPS' RADIO-TELEPHONY.—On the initiative of the Verein für Radiotechnik, experiments are being made with the equipment of freight-carrying vessels on the River Danube with radio-telephone apparatus for the transmission to, and the receipt of messages from, the goods, warehouses and despatching offices in the various towns on the river. Telegraph facilities on the Danube are not very extensive.

Canada.—FLASH TELEGRAPH SERVICE.—Imperial and International Communications, Ltd., announce that owing to the installation of improved apparatus on their two Imperial cables an exceptionaly rapid telegraph service is now available to the public and in consequence they have instituted a special "preferred" class of telegrams to Canada.

Egypt.—TELEPHONE SERVICE.—The Postmaster-General announces that the telephone service is now available in Egypt to Port Said. The charge for a three-minute call from London to Port Said will be the same as for a call to Cairo or Alexandria, namely £3 12s.

Great Britain.—RADIO RELAY EXCHANGES.—Lowestoft Corporation has been informed that Home Radio (Lowestoft) is prepared to proceed with its scheme for the provision of radio relay services within the borough in accordance with the terms laid down by the Council.

Seaford Urban Council has refused applications from various companies for permission to establish a service in the town.

The Edward Prior Electric Co., Ltd., of Burgess Hill, has applied to the Haywards Heath Urban Council for permission to introduce the relay system.

Ware Urban Council has granted an application for the establishment of a service for the town.

Hull.—TELEPHONE EXTENSIONS.—The Corporation Telephones Committee has obtained sanction to borrow £61,200 for the extension of, and alterations to, the telephone undertaking.

London.—RADIO LICENCES.—More than fifty prosecutions for evading the payment of the annual 10s. receiving licence fee have been instituted in London alone since the Post Office campaign against radio "pirates" commenced on October 1st. During the first eleven days of the month 154,000 licences were issued, whereas last month only 2,800 were issued daily.

NEW TELEPHONE EXCHANGE.—The Hither Green automatic telephone exchange at Bromley Road, Catford, S.E., which has accommodation for 9,600 subscribers' lines, was opened last week-end.

Russia.—TELEPHONY.—According to the *Moscow Weekly News*, Moscow will have 714,000 telephones by the end of 1937. About 214,000 will be in factories and offices, and the remainder in apartment houses. This will be nearly six times the number of telephones in use in Moscow to-day, which has now only about 120,000, an average of three per hundred inhabitants. Four automatic exchanges have been built during the past year and a fifth is practically completed.

Spain.—WORLD RADIO.—There are 140,000,000 radio listeners in the world, according to figures announced at the International Radio and Telegraph Congress at Madrid. The statistics have been compiled by the International Broadcasting Union, of which Vice-Admiral Sir Charles Carpendale, the Controller of the B.B.C., is president. Since December, 1919, more than 34,500,000 homes have secured radio sets; almost half of that number is in Europe and another 50 per cent. is in North America. The value of all the individual wireless sets in the world is estimated at £299,000,000, and about £39,000,000 is spent every year throughout the world on actual broadcasting. The annual consumption of electric current due to broadcasting is said to be 1,573,200,000 kWh.—*Reuter* (Madrid).

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Australia.—MELBOURNE.—December 6th. Post and Telegraph Department. Submarine telephone cable. (A. 11511.)*
December 13th. Lead-covered switchboard cable. (A.X. 11545.)*
December 20th. Multiple-twin wire telephone cable. (A.X. 11537.)*
December 19th. City Council. Totally enclosed metal-clad 6,600-V switchgear. (A.X. 11544.)*

Belgium.—BRUSSELS.—October 27th. Service de l'Electricité d'Ixelles. Supply of 170 d.c. and 400 a.c. electricity meters. Particulars from 20, Rue d'Alsace-Lorraine, Ixelles, Brussels.

Bolton.—November 7th. Corporation. Electrical installation at 416 houses and flats, &c., on the Johnson Fold Housing Estate. (See this issue.)

Egypt.—CAIRO.—December 3rd. Ministry of the Interior. Electrical distribution network at Tanta. (A.X. 11529.)*
December 10th. Diesel engines, alternators, switchgear, &c. (A. 11530.)*
December 14th. Ministry of Public Works. 32-kW oil engine driven generator set for the Marouf power station. (A.X. 11551.)*

Fleetwood.—October 29th. Electricity Department. H.p. and l.p. cables. (October 14th.)

Halifax.—October 31st. Town Council. Electricians' work at Northowram Hall Isolation Hospital. Mr. D. T. Lloyd Jones, borough engineer, Crossley Street (deposit £2 2s.).

Huddersfield.—December 1st. Royal Infirmary. Lamps and electrical sundries. General superintendent and secretary.

India.—NEW DELHI.—November 7th. India Stores Department. Electric capstans for Vizagapatam Harbour. Director-General, India Stores Department, Belvedere Road, S.E.1 (deposit 10s.).

Irish Free State.—(DUBLIN).—November 7th. Dublin United Tramways Co. (1896), Ltd. Stores, including cables, car fittings, lamps, electrical fittings, &c. Mr. G. Marshall Harriss, general manager, 59, Upper O'Connell Street, Dublin (form of tender, 2s. 6d.).

Kilmarnock.—Town Council. Electric lighting work at 90 houses. Mr. T. C. Stewart, Clydesdale Bank Chambers, Kilmarnock.

London.—FULHAM.—October 29th. Electricity Department. Condensing plant, &c. (September 30th.)
SOUTHWARK.—October 26th. Electricity Department. Cable. (October 14th.)

Manchester.—October 25th. Watch Committee. Electric lighting of police station, Platt Lane, Wilbraham Estate. City architect, Town Hall (deposit 10s. 6d.).
November 5th. Electricity Department. Sub-station switchboards and water-softening plant. (See this issue.)

Oban.—October 28th. Electricity Department. Rotary or motor convertor. (October 7th.)

Singapore.—November 15th. Municipal Council. Electrically driven sewage pump. (G.X. 11920.)*

South Africa.—CAPETOWN.—November 9th. Electricity Department. H.p., l.p. and telephone cables. (A.X. 11521.)*
GRAHAMSTOWN.—November 8th. Corporation. Transformers and other equipment (A.X. 11524)* and turbo-alternators and accessories (A.X. 11525.)*
JOHANNESBURG.—November 12th. City Council. Time switches.

Straits Settlements.—SINGAPORE.—November 15th. Municipal Council. Sewage pumps, electrical equipment, &c. (G.X. 11920.)*

Stranraer.—October 24th. Town Council. Electrical fittings for housing scheme. Mr. A. Maclean Goudie, architect, 30, Lochryan Street (deposit £1).

Walsall.—November 10th. Transport Committee. Fifteen double-deck trolley-buses.

West Lothian.—October 28th. County Council. Electric lighting installation at 92 houses, Newtown, Bo'ness. Mr. A. M. Smith, sanitary inspector, Linlithgow.

Wick.—October 22nd. Town Council. Electric lighting for housing scheme. Burgh surveyor, Wick (deposit £1 1s.).

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Aberystwyth.—Town Council. Accepted. Installation of electric lighting at Council houses (14s. 9d. per point).—L. Thomas and Son.

Birmingham.—Electricity Committee. Accepted. Re-winding transformers at Hams Hall power station.—Ferranti, Ltd. Removing superheaters at Hams Hall and provision of new superheaters.—Babcock & Wilcox, Ltd. Switchgear for Summer Lane power station.—A. Reyrolle & Co., Ltd. Installation of apparatus for electric lighting at Montague Street depôt.—T. Glover.
Watch Committee. Electric lighting and power at Perry Barr fire station.—Etna Heating & Lighting Co., Ltd. Internal fire-alarms, electric clocks, &c., at central police station.—Walker Bros. (Electrical Engineers), Ltd.

Canterbury.—City Council. Accepted. Provision and laying of cables for the Whitstable Road area (£2,194).—Standard Telephones & Cables, Ltd. Feeder switch (£195).—A. Reyrolle and Co., Ltd.

Carlisle.—City Council. Accepted. Automatic traffic signals for five junctions in the town.—Wardle Engineering Co., Ltd.

Chesterfield.—Electricity Committee. Accepted. E.h.p. truck type cubicle (£139).—British Thomson-Houston Co., Ltd.

Durham.—County Education Committee. Accepted. Installation of electric lighting in various schools: Haverton Hill (£263), T. B. Watson & Sons, Stockton (in lieu of the tender of F. Reid, Ferens & Co., withdrawn); North Hetton (£55), Washington Biddick (£92), and Blackhill (£60), Devereaux Moodie & Co.; Waldridge Lane (£115), T. A. Taylor; Castleside (£52), L. Urwin & Sons.

Glasgow.—Electricity Committee. Accepted. Plant and appliances in connection with the change of frequency.—108 transformers, reconditioned (£11,655).—Bruce, Peebles & Co., Ltd. Six transformers, reconditioned (£365).—British Electric Transformer Co., Ltd. Two rotary convertors, reconditioned (£393).—Metropolitan-Vickers Electrical Co., Ltd. New condenser equipment.—British Insulated Cables, Ltd. (£202); Telegraph Condenser Co., Ltd. (£169).

Golborne.—Urban District Council. Accepted. Installation of electric lighting in 56 houses (£349).—T. Twist & Sons.

Hastings.—Electricity Committee. Recommended. Transformers: One 3,000-kVA for Earl Street sub-station (£1,353) and one 250-kVA (157).—Ferranti, Ltd. One 200-kVA (£105) and one 250-kVA (£123).—Yorkshire Electric Transformer Co., Ltd.

Hereford.—Highways Committee. Recommended. Traffic signals (£117).—Revo Electric Co., Ltd.

Stockport.—Town Council. Accepted. Wireless equipment in connection with police motor patrols (£250).—H. Hollingdrake and Sons, Ltd.

York.—City Council. Accepted. Electrification of the villages of Sheriff Hutton and Welburn and other neighbouring districts in the North Riding.—Johnson & Phillips, Ltd.

Forthcoming Events

Faraday House Old Students' Association.—Friday, October 21st. Savoy Hotel, W.C. 6.30 for 7 p.m. Annual dinner.

Institution of Production Engineers.—Friday, October 21st. Holborn Restaurant, W.C. 6.30 p.m. Annual general meeting. 7 for 7.30 p.m. Annual dinner.

Physical Society.—Friday, October 21st. Imperial College of Science and Technology, South Kensington, S.W. 5 p.m. Short papers.

Institution of Electrical Engineers.—Monday, October 24th. Institution, London. 7 p.m. Informal meeting. Discussion on "The Future Prospect for Electrical Engineers," opened by the President. (*North-Eastern Students' Section.*)—Friday, October 21st. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. Chairman's address. "The Construction of Large Alternating Current Generators." Mr. E. Yeeles. (*North-Eastern Centre.*)—Monday, October 24th. Armstrong College, Newcastle-upon-Tyne. 7 p.m. Chairman's address. Mr. C. Turnbull. (*North Midland Centre.*)—Tuesday, October 25th. Hotel Metropole, Leeds. 7 p.m. Chairman's address. Mr. R. M. Longman. (*North-Western Students' Section.*)—Tuesday, October 25th. Engineers' Club, Manchester. 7.15 p.m. "Electrical Equipment of Oil Wells." Mr. J. Gillespie. (*West Wales (Swansea) Sub Centre.*)—Friday, October 28th. Electricity Offices, Swansea. 6 p.m. Chairman's address. Mr. J. W. Burr. (*London Students' Section.*)—Friday, October 28th. Institution, London. 6.15 p.m. "What of the Future? With Electro-farming as an Illustration." Mr. R. Borlase Matthews.

Nottingham Society of Engineers.—Monday, October 24th. Welbeck Hotel, Nottingham. 7.30 p.m. "Television Development." Mr. J. J. Denton.

Paisley Association of Electrical Engineers.—Tuesday, October 25th. Y.M.C.A., Paisley, 7.30 p.m. "Electrical Switchgear." Mr. W. G. Martin.

Chartered Institute of Patent Agents.—Wednesday, October 26th. Hotel Victoria, W.C. 6.45 for 7 p.m. Jubilee dinner.

British Electrical Development Association (Northern Counties Area).—Thursday, October 27th. Sopwith's Lounge, Newcastle-upon-Tyne. 7.15 p.m. "Public Speaking." Mr. G. S. Francis.

Junior Institution of Engineers.—Friday, October 28th. Institution, London. 7.30 p.m. "Electrical Engineering as Applied to Theatres and Cinemas." Mr. R. Gillespie Williams.

Birmingham Electric Club.—Friday, October 28th. Grand Hotel, Birmingham. 7 p.m. "The Recording and Reproduction of Talking Pictures." Mr. V. M. Roberts.

Institution of Mechanical Engineers.—Friday, October 28th. Institution, London. 6 p.m. Presidential address. Mr. W. Taylor.

Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following:—

T.P. & S. electric fire.
GOLDEN ARROW lamp adaptor.
TX ONE Two heat and light adaptor.

The Institute of Fuel

The annual dinner and dance of the Institute of Fuel was held on Wednesday at the Connaught Rooms, Great Queen Street, W.C. During the evening the Melchett Medal was presented to Mr. C. M. Schwabb.

Notes

Railway Electrification Standards

The Minister of Transport has made the Railway (Standardisation of Electrification) Order, 1932, under the Railways Act, 1921. The Order follows the advice of the Railway Electrification Committee (1927), and provides that future schemes of electrification of standard gauge railways shall be on the d.c. system, at a maximum of either 1,500 V with overhead collection, or 750 V with top contact third-rail collection, subject to the power of the Minister to consent to a maximum pressure of 3,000 V with overhead collection in special conditions. Maximum loading gauges of electric locomotives are specified and provision is also made for the standardisation of methods of collection and third-rail and overhead equipment. Through running of electric locomotives between the 1,500-V and 750-V systems in the future is dealt with by a provision that when one-third of the steam locomotives of a company have been replaced by electric tractors, such electric locomotives as the Minister shall direct shall be equipped with lower-voltage motors and series-parallel switching equipment, &c., so as to render them capable of through running on both higher and lower-voltage systems.

All-electric Working Class Flats

That the all-electric flat must no longer be considered a privilege of the well-to-do only is once more made evident by the decision of the St. Pancras House Improvement Society, Ltd., to equip all the new flats on its Garden Estate, Bridgewater Street, with electricity for heating, cooking, and hot-water supply.

These flats, which are believed to be the first of their kind so constructed, are being built for the Society under the direction of Mr. I. B. M. Hamilton, A.R.I.B.A., to rehouse working-class families who cannot afford to pay an economic rent and who are at present being very badly overcrowded in condemned tenement houses. Three blocks of these dwellings have been completed, and the latest block of thirty-five flats was opened by Lady Patricia Ramsey last Friday.

For an inclusive charge of 1s. 9d. a week, collected with the rent, the St. Pancras Electricity Department provides tenants with all the electrical equipment installed, a charge of ½d. per kWh being made through shilling prepayment meters for electricity consumed.

Each flat contains as a rule four or five rooms—a living room, one or two bedrooms, a kitchen, and bathroom. The lighting installation is of plain yet efficient design, and the wiring for this as well as for the rest of the electrical equipment has been carried out by Messrs. W. G. Bailey.

One 2-kW Belling "Bungalow" fire is supplied for each dwelling, and for cooking there is a 4½-kW Moorwood cooker. In the kitchen a 10-gal. "Genii" water-heater gives an adequate supply of hot water, while for the use of every five flats one "Burco" wash-copper is provided. A 6-lb. Falk, Stadelmann iron is also included in the apparatus installed.

The Birmingham Electric Club

The annual Ladies' Evening of the Birmingham Electric Club was held at the Grand Hotel, Birmingham, on Friday, October 14th. Nearly 500 guests attended, and they were received by the President (Mr. J. Entwistle) and Mrs. Entwistle. During the supper interval, the President paid tribute to the work of Mr. W. E. Clark, the social secretary, and the Social Committee, and to Mr. F. W. Martin, a past president of the Club, who performed the duties of M.C. for the dancing. Mrs. Entwistle replied to the toast of "The Ladies." The function took place in the newly decorated Grosvenor Suite at the hotel, a feature of which is the attractive electrical illumination which has been installed. Special floral and flood lighting decorations were arranged for the occasion by a member of the Club.

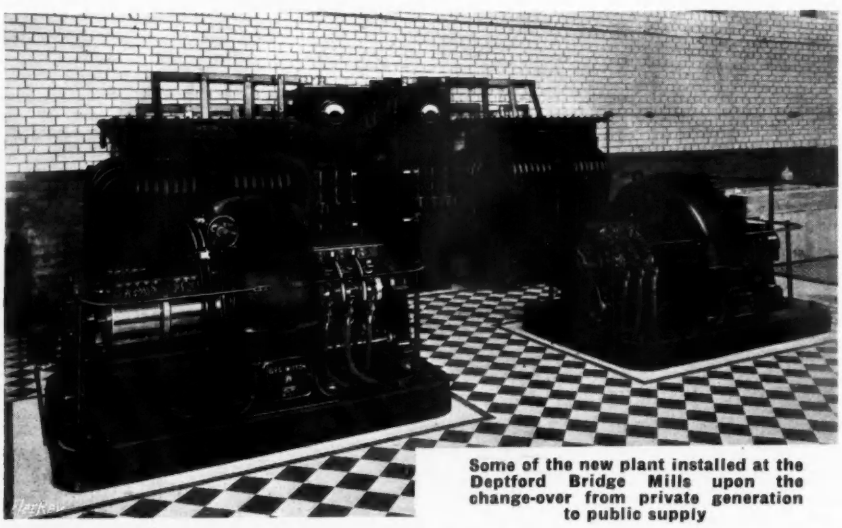
Electricity in Mines

The report for 1931 of Mr. J. A. B. Horsley, H.M. Electrical Inspector of Mines, has now been published (Stationery Office, 9d. net). Electricity was used at 1,409 mines out of a total of 2,243, and the horse-power of motors installed at June 30th, 1931, was 1,833,536, or 17,000 more than at June 30th, 1930. The statistical tables include a regional analysis of the horse-power of motors installed, showing the extent to which d.c. and a.c. are used, and giving analyses (with comparative figures for ten years) of fatal accidents.

There were twenty-four lives lost in eight fatal accidents attributable to the use of electricity during 1931. The Inspector gives an account of these and makes comments and suggestions with a view to preventing accidents of a similar nature in future. A number of the non-fatal accidents and dangerous occurrences of an unusual nature are also described. A table is included giving the number of ignitions of firedamp due to the use of electricity during the last ten years. Analyses of the number and description of coal-cutting machines in use at coal mines during the last ten years are given, together with regional analyses of the quantities of machine-cut coal and other minerals cut by electricity and by compressed air. Included in the appendices to the report is a schedule of certificates as to flameproof enclosure of electrical apparatus which have been issued by the Mines Department during the year.

A Flour Mills Conversion

The Deptford Bridge Mills of Messrs. J. & H. Robinson, Ltd.,—one of the largest firms in the trade—have been changed over from producer-gas plant aggregating about 2,000 h.p., to bulk supply at 6,600 V, 3-phase, a.c., from the London Electric Supply Corporation, Ltd. The machinery is all electrically driven and is divided into three sections, one driven through belts and shafting by a 6,600-V synchronous induction motor, one by 400-V a.c. motors, and one by 200-V d.c. motors. A contract was placed with the General Electric Co., Ltd., for a 800-h.p. synchronous-induction motor and two 250-kW rotary convertors with the necessary transformers and starting panels. Although the load factor of the mill is about 70 per cent., the entire change-over was carried out, in collaboration with Messrs. J. & H. Robinson's engineering staff, in a short time without interruption of normal working.



Some of the new plant installed at the Deptford Bridge Mills upon the change-over from private generation to public supply

The synchronous induction motor drives a flour mill through line shafting and steel belts, a flexible coupling being provided between the machine and the extension shaft. The motor is of standard G.E.C. design, running at 250 r.p.m. and capable of developing a momentary starting torque approaching 1,250 h.p. Electrically driven barring gear is fitted to enable ropes and belts to be put on easily at a slow speed. A B.S.I. rated liquid starter is electrically interlocked with the stator oil circuit breaker.

The rotary convertors supply an average d.c. load of about 450 kW at 205 V for subsidiary factory machinery driven by d.c. motors; the a.c. supply is transformed to 150 V for the convertors, which run at 1,500 r.p.m. The machines are arranged for tap starting and are of standard construction apart from the design of the commutators, which are longer than usual, are specially designed to deal with the high currents, and are strengthened by steel rings. The synchronous induction motor is arranged to give a leading power factor if desired, and some further improvement is also obtainable from the rotary convertors.

Acknowledgments are due to Mr. W. E. Thompson, director and engineer at the Deptford Bridge Mills, for permission to publish this description.

Coloured Illuminated Guard Posts

An entirely new design of illuminated guard post was exhibited at the Building Trades Exhibition at Olympia by the Cardiff Foundry & Engineering Co., Ltd., Hurman Street, Cardiff. It is known as the "Pillar of Fire" and has a hinged and locked cap containing a 100-W lamp and a "Gecoray" silvered parabolic reflector. This gives a reddish light at the top of the pillar and a yellow light at the base. These pillars have been inspected by the Ministry of Transport and seven have just been installed at Cathays Park, Cardiff.

Appointments Vacant

Showroom assistant for London & Home Counties Joint Electricity Authority.

Instrument and meter repairer for Grimsby Electricity Department.

Showroom assistant and lady demonstrator for Barrow-in-Furness Electricity Department.

(See our advertisement pages to-day.)

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. C. A. Hopkins, transport manager with Sunderland Corporation, has been recommended for the appointment of transport manager at Blackpool at a salary of £1,000 per annum.

Mr. Arthur C. Bishop, until recently sales engineer of Messrs. Berkeley & Young, Ltd., has been appointed sales manager of this concern.

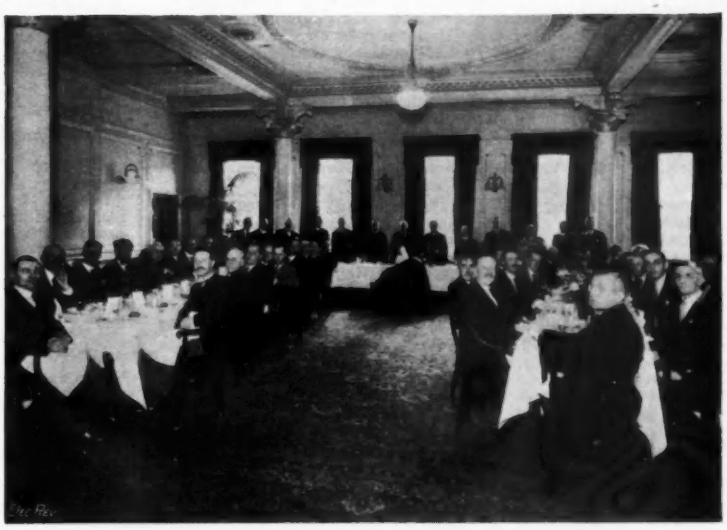
Mr. J. E. Macfarlane has resigned from his position as chief designer to Messrs. Newtons of Taunton, Ltd., and his address is 17, Eastwick Avenue, Taunton.

A.S.E.E. Awards.—At the meeting of the Association of Supervising Engineers held on Tuesday last, the prizes in the meeting's discussion award competition were presented to the winners by Mr. S. B. Donkin. The winners were: First prize (value £5), Mr. R. W. Whitley; second prize (value £3), Mr. W. R. Durtnall; third prize, (value £2), Mr. R. W. Medcalf.

Professor J. A. Crowther, M.A., Sc.D., has been elected honorary secretary of the Institute of Physics to succeed **Professor A. O. Rankine, O.B.E., D.Sc.** Prof. Crowther was for many years a lecturer at Cambridge, and was appointed Professor of Physics in the University of Reading in 1924. He is now also Dean of the Faculty of Science of that University.

Towards the conclusion of the electrical exhibition held last week at the Town Hall, Torquay, under the auspices of the Corporation Electricity Department, the exhibitors on October 14th presented an illuminated electric clock to **Mr. G. J. Hollyer,** the borough electrical engineer, in recognition of the able way in which he had organised the exhibition and carried it to success. Presentations were also made to **Mr. H. H. Thompson,** accountant of the Electricity Department, and **Mr. T. W. McKay,** the mains engineer. The Mayor paid a high tribute to the officials and staff of the Electricity Department.

On October 14th, **Sir Hugo Hirst, Bt.,** chairman and managing director of the General Electric Co., Ltd., presided over a gathering of fifty-one members of the company's staff, who were assembled at a farewell luncheon at the Connaught Rooms to their colleague, **Mr. William Griggs,** who has just retired after 50 years' unbroken service with the company. Sir Hugo proposed the toast of the guest of honour and recalled many incidents to show how high was the esteem in which Mr. Griggs had always been held by everybody who came into contact with him. He then presented him with a radio set, a clock and a cheque—a gift from his colleagues at the head office. It is interesting to note that the combined years of service with the G.E.C. of the assembled company was 1,603 years, giving an average service of over thirty-one years. Among the directors supporting Sir Hugo Hirst were Messrs. M. J. Railing (general manager and joint managing director), S. D. White, M. Solomon, L. C. Gamage, H. W. Roberts, and F. Winstanley.



The farewell luncheon to Mr. W. Griggs of the G.E.C.

Mr. F. Thursfield, who recently retired from the position of general manager of the Leicestershire and Warwickshire Electric Power Co., was the chief guest at a meeting of the staff at the Union Hotel, Hinckley, on October 12th, when he was presented with a walnut bureau by the Hinckley staff; Mrs. Thursfield received a tea table. The Leamington staff presented Mr. Thursfield with a blotter. Mr. A. D. Phillips, the new manager, occupied the chair. Mr. M. A. Edwards, a director, made the presentation on behalf of the Hinckley staff, and Mr. P. Oliver, on behalf of the Leamington staff.

At a recent meeting of the Durban Town Council, a motion was brought forward by Councillor Fleming Johnston for the amalgamating of the three large trading departments, *i.e.*, Electricity, Tramways and Telephones, under one general manager; the motion was adopted in principle. A committee has been appointed to examine the proposition in detail and present an early report thereon. In view of the fact that applications are now under consideration for the appointment of borough electrical engineer, due to the retirement of the present engineer, **Mr. John Roberts,** who reaches the pensionable age in December next, applicants will be interested in the terms of the motion, which are:—(a) That the appointment of a borough electrical engineer be left vacant; (b) that the Electricity Department be placed temporarily in charge of the assistant borough electrical engineer; (c) that Mr. John Roberts be relieved of his present duties; (d) that he be asked to extend his services for a further year; and (e) that Mr. Roberts undertakes the reorganisation and amalgamation of the three departments under one general manager. The proposal to amalgamate the three departments is not new, a similar proposal having been adopted several years ago, but it was very short-lived; it is estimated now, however, that there will be an annual saving of from £6,000 to £10,000.

Alderman R. Tweedy Smith, chairman of the Sun Electrical Co., Ltd., and hon. solicitor to the Electrical Contractors' Association, has accepted the mayoralty of Southend-on-Sea. He was previously mayor of the borough in 1924-5, having entered the Town Council in 1919.

Mr. L. F. Fogarty has been appointed by the Ruislip-Northwood Urban District Council as its representative on the London and Home Counties Joint Electricity Authority, in place of **Mr. S. W. West,** who has resigned.

Mr. R. Worrall, of Willenhall, a mining electrical engineer on the staff of the Metropolitan-Vickers Electrical Co., Ltd., Manchester, was married recently to Miss Margaret Heath, and was presented by his colleagues with an electric coffee percolator. Mr. Worrall has been responsible for many installations in this country and abroad.

Mr. H. Th. Holm, of the Bofors Steel and Armament Works, will be the new chief of the L. M. Ericsson Telephone Co. Mr. Holm has for many years been at the head of the Bofors Company and he had acquired much valuable experience as an international negotiator, which is expected to be of special importance to the L. M. Ericsson concern with its wide field of foreign interests and telephone concessions. His successor as head of the Bofors Works will be **Dr. Sven Wingquist,** previously managing director of the S.K.F., the Swedish ball bearing works. He has long been a member of the boards of directors of both the S.K.F. and the Bofors Works.

Obituary

Mr. A. Hands.—The death took place on October 10th of Mr. Alfred Hands, M.I.E.E., of Plumberow Mount, Hockley, Essex, director of J. W. Gray & Sons, Ltd., lightning conductor experts. He was 73 years of age and a member of the Société Astronomique de la France. Mr. Hands was a leading authority on the protection of buildings from lightning. He had a very wide practical knowledge of the subject and from time to time lectured very acceptably before popular and other audiences.

The Dairy Show

Though many of the machines exhibited at the Dairy Show at the Agricultural Hall, which closes to-day (Friday), have electric drives, there are relatively few new models. J. Bannett & Sons show a new large mixer for cattle or poultry food which can be electrically driven. The new "Vaccar" milker has been simplified, and the parts can be more easily removed for washing than in the older models. The Midland Dairy Machines, Ltd., exhibit a direct-coupled milk purifier. Bottle-washing machines are shown by Messrs. Hill's of Hull. Their new model has a revolving brush driven from the motor by a V-belt drive; the bottle is fed on to the brush by hand. The Dairy Outfit Co., Ltd., demonstrates a new model with three brushes, so that any size of bottle can be cleaned without the necessity of changing the brush. The brushes are directly driven from a ¼-h.p. enclosed motor, and the machine can be attached to any washing trough.

The Dairy Supply Co. has now attached a bottle capping machine to its electrically driven bottle-filling machine. Multifillers introduce a new rotary filling machine for all sizes of bottles. Electricars, Ltd., show a new electric milk-delivery van. This van has a capacity for 480 bottles and will deliver milk over a 15-mile route at the expenditure of 5 kWh for battery charging. Hearson's incubators are shown by Spratt's Patent, Ltd.; there are two new models with capacities of 720 and 1,440 eggs respectively. Beatty Bros. exhibit a small pressure pump which is automatically controlled and is driven by a ½-h.p. motor.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

New North Radio, Ltd.—Private company. Registered October 12th. Capital, £500 in £1 shares. Objects: To acquire the business of a radio dealer now carried on by N. L. Harris, at 377, New North Road, Islington, N. The directors are: N. L. Harris, 88, Priory Gardens, Highgate, N., and J. H. Harris, Stonelands, Frome, Somerset. Registered office: 377, New North Road, Islington, N.1.

Beco, Ltd.—Private company. Registered October 12th. Capital, £4,000 in 3,500 6 per cent. preference and 500 ordinary shares of £1 each. Objects: To acquire the business of an electrical and general engineer as formerly carried on by H. A. Easter as "The British Electric Co.," at Easter Works, 25/9, Lower Road, Rotherhithe, S.E.16, and to carry on the business of electrical, mechanical and general engineers, &c. The directors are: H. A. Easter and Mrs. Dorothy M. Easter, 25/9, Lower Road, Rotherhithe, S.E.16. Registered office: Easter Works, 25/9, Lower Road, Rotherhithe, S.E.16.

Victor T. Montrose & Co., Ltd.—Private company. Registered October 12th. Capital, £1,500 in 1,000 6 per cent. participating preference shares of £1 and 10,000 ordinary shares of 1s. each. Objects: To carry on the business of electrical engineers and contractors, manufacturers and retailers of electrical and radio apparatus, &c. The permanent directors are: V. T. Montrose, 92, The Grove, Ealing, W.5; and J. F. Donelly, 36, Mount Durand Road, Guernsey. Secretary: J. F. Donelly.

Leader-Way, Ltd.—Private company. Registered October 14th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, dealers in electrical, mechanical and radio products, manufacturers and repairers of and service agents for vacuum cleaners, stoves, fires, radiators, geysers, &c. The permanent directors are: R. F. R. Currey, Quarley Rectory, Hants; L. V. Hazlewood, Queen's College, Paradise Street, Birmingham; and A. H. Shattock, Hall Place, Beenham, Berks. Solicitors: Cottrell & Son, Birmingham.

Turnadge & Partners, Ltd.—Private company. Registered October 5th. Capital, £300 in 1,000 ordinary shares of 1s. and 250 10 per cent. preference shares of £1 each. Objects: To carry on the business of importers and exporters of and dealers in wireless, electrical and scientific apparatus, dealers in electrical, mechanical and other kinds of advertising signs and appliances, &c. The directors are: C. J. Turnadge, 3, Stanmore Gardens, Richmond, Surrey; G. M. H. Foster, 210, Holland Road, Kensington, W. Registered office: Ludgate House, Fleet Street, E.C.

Lamps (Coventry), Ltd.—Private company. Registered October 15th. Capital £100 in £1 shares. Objects: To carry on the business of retailers and factors of electric lamps and electrical equipment, electrical engineers and contractors, &c. The subscribers are: A. L. Bill, Holmfield, St. Nicholas Street, Coventry; and J. Weaver, 29, Spencer Avenue, Coventry. Solicitors: R. A. Rotherham & Co., Coventry.

St. Paul's Radio, Ltd.—Private company. Registered October 15th. Capital £800 in £1 shares (100 ordinary and 700 deferred). Objects: To acquire the business of a manufacturer of radio receiving sets carried on by J. E. Kinnear at 2, Milton Buildings, Watling Street, E.C., as the "Tower Royal Radio Co." The permanent directors are. J. E. Kinnear, 162, Askew Road, W.12; and F. J. Brain, 70, Croydon Road, Beckenham. Registered office: 2, Milton Buildings, Watling Street, E.C.4.

Gregson Boreham, Ltd.—Private company. Registered October 17th. Capital £2,500 in 1,000 ordinary and 1,500 7 per cent. cumulative preference shares of £1 each. Objects: To carry on the business of gas, electrical and general engineers; gas, electrical and wireless accessory manufacturers, &c. The directors are: A. Bland-Gregson, c/o Loxdales, 93, Gloucester Road, South Kensington, S.W.7; and Madeline G. Boreham, 57b, Harrington Gardens, South Kensington, S.W.7. Registered office: 9-11, Marban Place, Marban Road, W.9.

Wholesale Electric Supplies (Bolton), Ltd.—Private company. Registered October 15th. Capital £100 in 2s. shares. Objects: To carry on the business of manufacturers of and dealers in electrical, gas and oil lamps, electrical and wireless apparatus, &c. The directors are: H. E. Bentley, 4, Marsden Road, Bolton; and R. E. Bentley, 187, Ivy Road, Bolton.

Returns of Electrical Companies

Newcastle-upon-Tyne Electric Supply Co., Ltd.—Capital, £8,100,000 in 1,500,000 7 per cent. cumulative preference, 2,500,000 5 per cent. preference and 4,100,000 ordinary shares of £1. Return dated April 13th, 1932. 1,500,000 7 per cent. cumulative preference, 1,609,017 5 per cent. preference, and 4,045,056 ordinary shares taken up. £6,098,700 paid on 1,500,000 7 per cent. preference, 741,055 5 per cent. preference, and 3,857,645 ordinary shares. £1,055,373 considered as paid on 867,962 5 per cent. preference and 187,411 ordinary shares. Mortgages and charges: £4,941,550.

Bournemouth & Poole Electricity Supply Co., Ltd.—Capital £1,300,000 in 75,000 4½ per cent. cumulative preference, 175,000 6 per cent. cumulative preference, 150,000 new preference, and 900,000 ordinary shares, all of £1. Return dated April 19th (filed July 28th, 1932). 75,000 4½ per cent. preference, 175,000 6 per cent. preference, and 720,000 ordinary shares taken up. £550,000 paid on the 4½ per cent. and 6 per cent. preference and 300,000 ordinary shares. £420,000 considered as paid on 420,000 ordinary shares. Mortgages and charges, £187,500.

Dowsing Radiant Heat Co., Ltd.—Satisfaction in full on September 28th, of letter dated July 18th, 1932, and registered August 2nd, 1932.

Charge on 91/3, Baker Street, W., dated September 29th, to secure £250 and further advances (if any). Holders: A. Mackenzie and Nellie J. Mackenzie, both of "The Hollies," Beckenham Lane, Bromley, Kent.

General Electric Co., Ltd.—Satisfaction in full on or before August 31st, 1932, of 7 per cent. mortgage debenture stock authorised May 31st, 1921, secured by trust deed dated July 22nd, 1921, and registered July 26th, 1921, has been notified. (The trust deed registered July 26th, 1921, originally secured £3,500,000.)

Chelsea Electricity Supply Co., Ltd.—Capital, £460,000 in 30,000 preference and 430,000 ordinary shares of £1. Return dated April 21st (filed May 27th, 1932). 30,000 preference and 427,864 ordinary shares taken up. £218,850 paid on 30,000 preference and 188,850 ordinary shares, £239,014 considered as paid on 239,014 ordinary shares. Mortgages and charges: £72,380.

Richmond (Surrey) Electric Light & Power Co., Ltd.—Capital £200,000 in £1 shares. Return dated April 19th, 1932 (filed July 28th, 1932). All shares taken up. £200,000 paid. Mortgages and charges, nil.

Torquay Tramways Co., Ltd.—Satisfaction to the extent of £1,900 on September 30th of trust deed to secure prior lien debentures, dated March 8th, 1911, authorised by resolution of first debenture holders dated February 21st, 1911, and by resolution of directors also dated February 21st, 1911, and registered March 15th, 1911.

Sea Houses and District Electric Supply Co., Ltd.—Satisfaction in full on September 22nd of mortgage debenture in favour

Sir Hugo Hirst on the Basic Industries

THE causes of the depression in the coal trade and the iron and steel industries were reviewed by Sir Hugo Hirst, Bt., in his presidential address to the Institute of Fuel in London on October 19th.

In Sir Hugo's opinion coal owners have lagged far behind in the realisation that modern trade must be conducted on scientific principles. Coal is a potential source of heat, and the whole question of its preparation for the market and its sale should be based on this fact. It must be made possible for the purchaser of even a ton of coal to know, from the classification under which it falls, just what he is buying. The classification must be compulsory and at least national, and the industry itself should take the required action. The scientific treatment and use of coal will secure a steadier demand and a more constant development of demand.

It cannot be denied that coal owners have in the past been content to sell a raw material and distribute all the profits without rendering any effective assistance in its proper use, or in developing appliances for its efficient employment. What has the industry done in coal research? A really powerful organisation should be formed to undertake research and deal authoritatively with all matters relating to the preparation of coal for the market, its known uses, and those yet to be discovered. One-fifth of a penny on each ton of coal raised would provide £200,000 a year, which could profitably be spent on such work.

What is the steel industry doing to help itself? America has forged ahead in better equipment for the handling of materials, in a wider conception of what a steel works should be, in concentration of plant covering all branches for a self-contained works, including their own coke ovens, blast furnaces and rolling mills, in tariff protection, in low taxation, and last, but not least, in enterprise. We let the Germans get ahead of us by their research and application of scientific principle, by bold design of plant, and by sheer ability to improve everything on scientific lines. Sir Hugo considers that to-day Germany is ahead of all other countries in this industry.

The most immediate and important factor facing the industry is that its financial resources and borrowing powers have been exhausted. Its desperate plight has been recognised by the Government and at last a tariff on steel has been adopted and the Import Duties Advisory Committee has established a national committee to work out proposals for the reorganisation of the industry.

The steel industry has shown a better conception of its responsibilities under adverse conditions than has the coal industry and, considering its financial position, has done more in the way of research and plant improvement. Moreover, in the last few years important amalgamations have been brought about. Some of these, which associated dissimilar production, have not been very successful, but, generally speaking, only good can come from wise amalgamations from which important reorganisations will follow. The degree of courage with which this problem is tackled will largely affect the rapidity of success and will largely determine the degree to which the capital market will respond to appeals.

of Martins Bank, Ltd., dated June 26th, 1925, and registered July 6th, 1925. (According to the register of mortgages the debenture registered July 6th, 1925, originally secured all moneys due to bank.)

Wireless Trading Association, Ltd.—Particulars filed of debentures for not more than £5,000 authorised September 29th, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £350.

Tyche, Ltd.—Debenture dated October 3rd to secure £1,150, charged on the company's undertaking and property, including uncalled capital. Holder: R. Bindon-Blood, Craven Lodge, Speen, Berks.

Sentry Dry Battery Co., Ltd.—Debenture dated September 19th to secure £1,000, charged on company's undertaking and property, present and future, including uncalled capital. Holder: F. B. B. Kent, 85, Queen Victoria Street, E.C.

Waldron Electrical Manufacturers, Ltd.—B. Baddiel, Northampton Place, Swansea, was appointed receiver and manager on October 11th, under powers contained in debenture dated June 2nd, 1932.

J. B. Saunders (1923), Ltd.—Capital £5,000 in £1 shares (4,000 ordinary and 1,000 preference). Return dated June 21st, 1932. 4,000 ordinary and 795 preference shares taken up. £4,795 paid. Mortgages and charges, nil.

Brandes, Ltd.—Capital £20,000 in £1 shares. Return dated December 31st, 1931 (filed May 31st, 1932). All shares taken up. £10,392 paid. £9,608 considered as paid. Mortgages and charges, nil.

Spalton Electrical Stores, Ltd.—Debenture dated October 8th to secure £1,000, charged on the company's property, present and future, including uncalled capital. Holder: Mrs. E. G. Hodgson, Belgrave Lodge, Marine Drive, Bridlington.

D.P. Battery Co., Ltd.—Capital, £100,000 in £1 shares. Return dated May 19th, 1932. All shares taken up. £28,000 paid, £72,000 considered as paid. Mortgages and charges, nil.

Brentford Electric Supply Co., Ltd.—Capital, £75,000 in £1 shares. Return dated March 8th, 1932. 70,000 shares taken up. £70,000 paid. Mortgages and charges, nil.

Bennett & Fountain, Ltd.—Owing to a printers' error on page 585 of our issue of October 14th the capital of this company was given as £300 instead of £3,000. We regret the error.

City Notes

Grosvenor Electric Batteries, Ltd., held its annual meeting on October 14th, Mr. L. S. M. Wells (chairman), presiding. In presenting the report and accounts (ELECTRICAL REVIEW, October 14th, p. 585), the chairman said that trading during the past year had been neither easy nor normal, and the company had passed through an exceedingly difficult period. Owing to the imposition of tariffs and the departure from the gold standard, which both affected the price of raw materials, the year had been one of transition to new conditions, but offsetting this their combined effect had been to stop the importation of foreign batteries almost entirely, to the advantage of manufacturers in this country. The board was offering to shareholders one new share at par for every four held. Whilst the position remained liquid, the increasing business and output made more and greater demands upon the company's cash resources and might create a need for further capital, but until the need was imperative and its use on definitely profitable terms was assured this would not be contemplated.

The Electro Trust, Ltd., held its annual meeting on October 17th, when Mr. H. S. H. Guinness, who presided, in the course of his speech said that a valuation of the Trust's investments at June 30th, taking the market value of the quoted investments and placing a fair value on those not quoted, showed a depreciation equivalent to 36.8 per cent. on the amount at which the investments stood in the balance sheet. If reserves and carry-forward, after the payment of the dividend for the year, were taken into account, this depreciation was reduced to 26.6 per cent. The general rise in security prices which had taken place since June 30th had resulted in an improvement in the valuation. The chairman then briefly outlined the position and prospects of the electricity supply industry in this country, particularly referring to the progress made with the grid scheme by the Central Electricity Board.

The Norwich Electric Tramways Co. reports a net profit for the year ended June 30th last of £22,308 (against £26,831 in 1930-31), to which is added £1,519 brought in, making £23,828 available. Reserve receives £10,000, and it is proposed to pay a final dividend of 2½ per cent., making 5 per cent. for the year, and to carry forward £628. An agreement, in terms already provisionally settled, is in course of preparation whereby Norwich Corporation will acquire the company's tramway and omnibus undertaking, the purchase price being £175,000.

The Andhra Valley Power Co. reports a net profit of Rs. 22,45,256 for the year ended June 30th, as against Rs. 13,70,690 in the preceding year, to which is added Rs. 1,80,274 brought in, making Rs. 23,25,530. The final ordinary dividend is Rs. 40 per share, making 6 per cent. for the year (against 4 per cent.). The amount carried forward is Rs. 4,52,936.

The Shropshire, Worcestershire and Staffordshire Electric Power Co. has placed privately 300,000 new six per cent. preference shares of £1 each.

The Telephone & General Trust, Ltd., has declared an interim dividend of 3 per cent., actual, less tax, on the ordinary shares. Previously the Trust had not paid interim dividends, but in March last 8 per cent. was paid on the ordinary shares in respect of the year 1931.

The Electrolytic Zinc Co. of Australasia reports a net profit for the year ended June 30th of £85,090, as against £5,678 in the previous year, which with £7,000 brought in makes £92,090. Debenture sinking fund reserve requires £15,900, dividend No. 19 on the preference shares absorbed £60,000, and £16,190 is carried forward.

The Power Corporation of Canada reports a surplus for the year ended June 30th last, after deduction of expenses, taxes and interest, of $66,000. The statement shows gross revenue of $1,929,500, as compared with $2,654,500 in the preceding year. There was a previous accumulated surplus of $3,531,500. After the deduction of preferred common dividends and loss by sale of securities the net surplus carried forward is $1,810,000.—*Reuter* (Montreal).

Erinoid, Ltd., reports a net profit of £37,214 for the year ended July 31st, against £12,537 in the preceding year, which with the amount brought in makes £40,918. It is proposed to place £6,968 to tax reserve, £7,500 to general reserve, and to pay a dividend of 10 per cent., less tax (against 5 per cent.), leaving £6,699 to be carried forward.

The Manaos Tramways & Light Co. reports a profit of £7,256 for the year ended April 30th last, as compared with a loss of £2,850 in the previous year. After deducting debenture redemption charges, &c., there is insufficient to meet the annual charge for depreciation, and the balance of £3,442 is carried to the balance sheet, reducing the debit balance to £3,448.

The Tata Power Co. reports net profits of Rs. 13,45,599, as compared with Rs. 10,23,734 in 1930-31, to which is added Rs. 1,51,939 brought in, making Rs. 14,97,499. A dividend at the rate of 7½ per cent. per annum (subject to tax) has been paid on the preference shares for the two years ended September 30th, 1931, and Rs. 1,61,272 is carried forward.

Joseph Lucas, Ltd., reports a profit of £229,150 for the year ended August 7th, as compared with £208,813. As announced in our October 7th issue, the dividend is maintained at 15 per cent., plus a bonus of 5 per cent. The amount carried forward is £70,440 (against £59,980 brought in).

The Brazilian Traction Light & Power Co., Ltd., announces that in view of the conditions existing in Brazil, it has decided to defer consideration of any dividend payment on the ordinary shares until January next.

The Eastern Telegraph Co., Ltd., announces the payment of interest for the half-year ending October 31st, on their four per cent. mortgage debenture stock.

The Calcutta Electric Supply Corporation, Ltd., has declared an interim dividend on the ordinary shares of 5 per cent. (actual), less tax at 2s. 6d.

The Shanghai Electric Construction Co., Ltd., has declared an interim dividend of 4 per cent., tax free, on the ordinary shares (against 5 per cent., tax free).

Babcock & Wilcox, Ltd., have declared an interim ordinary dividend of 4½ per cent., less tax (against 7 per cent. last year).

The Anchor Cable Co., Ltd., has announced an interim dividend of 5 per cent. (same).

The Anglo-Portuguese Telephone Co., Ltd., has announced an interim dividend of 3 per cent. on the ordinary shares (same).

Stocks and Shares

TUESDAY EVENING.

THE outstanding feature in Stock Exchange Markets is the strength of all gilt-edged and similar classes of securities. In one way, it is, of course, a deplorable thing that money should be so difficult to employ at anything like remunerative rates in stocks and shares, since this implies stagnation in trade, and an inability on the part of capital to find remunerative avenues for its use. On the other hand, the country is accustomed to an occasional cycle when money becomes such a drug in the market that day-to-day cash can be arranged on the basis of a few shillings per cent. From the abstract point of view, the enormous rises that have taken place in the values of investment and fixed interest stocks, are of no particular use, in that, satisfactory as it is to have one's stocks appreciating, the income remains the same, and the only benefit obtained by the man in the street is the hope, which this fans, of a reduction in income tax.

Gilt-edged Strength

Prices of gilt-edged securities are now standing upon a basis of yield which, applied to British Government stocks, is about 3¼ to 3⅜ per cent. City of London Electric 5 p.c. debenture at 117½ is 3 higher on the week. London Power 5 p.c. debenture has risen to 110½. Most of the other debenture stocks in this section have put on 2 to 3 points.

Home Railway Stock

The rises in gilt-edged securities have attracted attention to Metropolitan Railway consolidated stock, which has further risen to 65. The argument is that with gilt-edged stocks paying 3¼ per cent., Metropolitan consolidated should be standing at about 67½, if Parliament intends to assent to the scheme for the establishment of a Trust, and the issue of London Transport "C" stock. The full details were published, of course, some time ago, when it was proposed that £100 Metropolitan Railway ordinary stock should receive £67 10s. London Transport "C" stock. It is not expected in the market that Parliament will have time, in the short session which opened on Tuesday in this week, to deal with the London Transport Bill. Therefore the matter is likely to be postponed until the first Parliamentary Session in 1933. If the scheme is not passed—a contingency which appears to be highly improbable, in view of the agreement which has been reached between the various parties concerned—Metropolitan consolidated is standing well above its proper value. No doubt is felt, however, as to the eventual exchange being offered to the Metropolitan Railway shareholders. Districts, too, improved to 63¼, and Underground Electric Railway ordinary shares are better at 18s. 6d. upon investment purchases.

Home Electricity Supply

A recent speech by the Minister of Transport at the opening of a new generating station in Shropshire has provided a signal for a fresh advance in shares of electricity supply companies, more particularly those outside the London area. Some of the London shares are, however, better by reason of the pressure to buy investment shares of the best class. Metropolitan ordinary rose 3s. to 50s., and County of London ordinary at 52s. are 3s. 3d. higher. South London ordinary shares at 33s. have risen 6d. London & Home Counties 4½ per cent. debenture advanced to 107. The latest issue of Central Electricity 4½ per cent. stock has moved up to 105, which is a premium of 9 points above the issue price.

The Provincial list is distinctly good. Rises have occurred in Bournemouth & Poole to 71s. 3d., North Eastern ordinary to 28s. 9d., Yorkshire to 40s., Northamptons to 47s. 6d., Midland Electric Power to 36s. 3d., Lancashires to 29s. 6d. Fife ordinary strengthened to 11s, 3d. Llanelly & District ordinary are firm at 19s. 3d., Isle of Thanet ordinary advanced to 22s., and Oxford ordinary to 35s. Newcastle & District are better at 30s. Richmond, at 49s. 6d., rose 3s. 3d. last Monday. North Somerset Electric ordinary improved to 31s. 6d.

The preference shares in this group are equally firm. Shropshire, Worcestershire & Staffordshire 6 per cent. preference advanced to 27s. 6d. Active demand for West Gloucestershire 6½ per cent. participating preference raised the price to 95.

Indian and Australian Investments

Attention is being turned to Australian industrials, by reason of the wonderful recovery made by the credit of the Commonwealth. Some of the Australian Colonial Government stocks have trebled in value during the past few months. The substitution of sane policy for the hot air of confiscatory talk has made an extraordinary amount of difference in the view with which the investor looks at Australian issues. To-day there is greater confidence felt in the Commonwealth than has been the case for several years past. Of the electric lighting and power shares, Adelaide Electric 6 per cent, preference is quoted at 90, the 5 per cent. "A" preference at 85, and the 6½ per cent. "C" preference at 100. The company's two debenture stocks are both 5 better. Melbourne ordinary stands at 110, the 8 per cent. preference shares of £5 each at 5½. Of the Indian issues, Tata Power 7½ per cent. "B" mortgage debenture stock has risen to 107½. Delhi Electric ordinary shares are better at 2⅜, Calcutta ordinary at 47s. 6d., and Cawnpore ordinary at 30s. Burma Electric Supply ordinary shares are 7s. 6d., and the 6 per cent. preference 15s.

Of other overseas stocks, Perak River Hydro-Electric ordinary are attracting a little attention in the neighbourhood of 2s. 3d., Tokyo Electric sixes have advanced to 75½; Kalgoorlie ordinary at 9s. retain the rise of last week.

Manufacturing and Equipment Shares

British Aluminium have improved to 27s. 6d., and Ever-Ready shares to 28s. 3d. Rises of 1/6 lifted Johnson & Phillips to 23s. 9d., Siemens ordinary to 25s. 9d. On the other hand, Crompton Parkinson eased off to 21s. 3d. Associated Electrical Industries ordinary shares are 6d. lower at 18s. 3d. English Electric preference put on 1/6, advancing to 13s. 9d., upon attention being called to the progress that the company is making. Henleys retain their rise at 6 1/6. Callenders are better at 3 1/6. Aron Electricity Meter ordinary changed hands at 17s. and 17s. 3d. Philips Incandescent Lamps are a little better at 30s.; the company is said to be adding a "talkie" branch to its business.

Dollar Stocks

The American market, after suffering acute flatness, recovered to some extent. The worst of the recent slump appears to be over, but there remains a feeling of hesitation on the part of those who had hitherto been following the market as it advanced. A good deal of money has been lost on the fall, not only in New York, but on this side of the Atlantic as well. American Telephone & Telegraph have recovered to 152½, showing a gain of 5 points after their last week's fall of 16. Internationals are 1 better at 14. Shawinigan Water, at 18¼, are ¼ higher, and Power Corporation of Canada at 13 are a dollar down. Hydro-Electrics, from 9, fell to 8¼, recovering later to 9. Consolidated Gas & Electric of Baltimore at 90 is 22½ points better. Amongst the Mexican issues, Mexico Tramway 5 per cent. bonds at 45 show a gain of 10. Brazilian Tractions at 12 have fallen 1¼. The company has decided to postpone any dividend action on the common shares until next January.

Cables and Wireless

Sales by people anxious to take profits on their recent purchases have caused a slight reaction in Cables and Wireless stocks. Compared with the recent rises in the issues, the decline is negligible. Anglo-American Telegraph preferred rose to 104¼. Globe ordinary, after being better at 10½, went back to the previous level of 10¼. Marconi Marines hold their rise at 31s. 3d. Telephone Rentals are a shade firmer at 5s. 6d., Telephone Manufacturing at 3s. 10½d.

Among the Iron and Steel shares, Babcock & Wilcox fell 5s. to 37s. 6d. upon an interim dividend announcement of 4½ per cent., against 7 per cent. a year ago. So keen, however, is the demand for good industrials that the price quickly rallied to 38s. 9d. ex dividend. Other shares in this group are quiet, and little changed in price. The rubber market shows no alteration from its previous somnolent condition.

Share List of Electrical Companies

Home Electricity Companies.

	Nom.	Approx. Dividend. 1930.	1931.	Price, Oct. 18	Rise or Fall.	Yield p.c. £ s. d.
Bournemouth and Poole	1	15	15	71/3	+1/6	4 4 0
Brompton Ordinary	1	8½	8½	31/–	—	4 16 4
Central Electricity 4½% Deb.	Stock	4½	4½	104	+1	4 6 7
Charing Cross Ordinary	1	8½	8½	32/–	—	4 7 6
Chelsea	1	8½	8½	31/6	—	4 9 0
City of London	1	10	10	42/6	—	4 14 1
Clyde Valley	1	8	7	32/6	+1/6	4 6 2
County of London	1	11	10½	52/–	+3/3	4 0 9
Edmundsons' 7% Pref.	1	7	7	29/6	+6d.	4 15 0
Elec. Dis. Yorkshire	1	9	9	41/3	+6d.	4 7 4
Elec. Supply Corporation	1	11	11	55/–	—	4 0 0
Kensington Ordinary	1	8	8	32/6	—	4 6 2
Lancs. Light and Power	1	6½	7	29/6	+9d.	4 15 0
London & Home Counties 4½% Deb.	Stock	4½	4½	107	+1	4 4 1
London Electric	1	9	9	32/–	—	4 7 6
Metropolitan	1	10	10	50/–	+3/–	4 0 0
Midland Counties	1	7	7	35/9	—	4 3 0
Mid. Elec. Power	1	8	8	36/3	+1/6	4 8 5
North Eastern Electric Ordinary	1	6	6	28/9	+1/6	4 3 6
Do. 7% Pref.	1	7	7	30/6	—	4 11 10
Northampton	1	10	10	47/6	+1/6	4 4 2
Notting Hill 6% Pref.	10	6	6	12½	—	4 16 0
North Met. Elec. 6% Pref.	1	6	6	28/6	+6d.	4 4 3
St. James' and Pall Mall	1	8	8	31/–	—	4 10 4
Scottish Power	1	8	8	33/9	—	4 14 10
South London	1	8½	8½	33/–	+6d.	4 4 10
Urban Ordinary	1	7	7	35/–	+2/6	4 0 0
Westminster Ordinary	1	8½	8½	31/6	—	4 9 0
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	16/3	—	9 4 10
Yorkshire Elec.	1	8	8	40/–	+1/6	4 0 0

Home Rails.

Central London Ord. Assented	Stock	4	4	81½	—	4 18 2
Metropolitan	,,	3½	2½	65	+1	3 17 0
Do. District	,,	5	4½	63½	+2	7 1 8
Underground Electric	1	8	7	18/6	+6d.	7 11 4

Telegraph and Telephones.

American Tel. & Tel.	$100	9	9	152½	+5	5 18 0
Anglo-Am. Tel. Pref.	Stock	6	6	104½	+1	5 14 10
Do. Def.	,,	1½	1½	26	—	5 15 5
Cables & Wireless 5½% Pref.	,,	5½	2½	74½	—1	3 13 10
Do. A 7½% Ord.	,,	—	Nil	28	—½	—
Do. B ord.	,,	—	Nil	13	—½	—
Globe Tel. and T. Ord.	10	8½	Nil	10½	—	—
Do. do. Pref.	10	6	6	11½	—	5 4 4
Great Northern Tel.	10	20	20	26	—	7 13 10
Marconi-Marine	1	15	10	31/3	—	6 8 0
Oriental Telephone Ord.	1	12	12	2½	—	*4 7 5

Home and Foreign Trams, etc.

Anglo-Arg. Trams First Pref.	5	—	—	5/–	—	—
Do. do. 2nd Pref.	5	—	—	3/9	—	—
Do. do. 5% Deb.	Stock	—	—	7	—	—
British Electric Traction Def. Ord.	,,	5	5	300	—	—
Do. do. Pref. Ord.	,,	8	8	133½	—	5 19 10
Brazil Traction	100	—	—	12	—1½	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	100½	—	4 19 6
London & Sub. Trac. 5% Pref.	1	Nil	Nil	10/–	—	—
London United Tram Deb.	Stock	4	4	62½	—	6 8 0
Mexico Trams, 5% Bonds	—	5	5	45	+10	11 2 2
Mexican Light Common	100	Nil	Nil	12½	—	—
Do. 7% Pref.	100	7	7	20	—	—
Do. 1st Bonds	—	5	5	65½	—	7 12 8
Victoria Falls Ord.	1	15	15	75/–	—	4 0 0
Yorkshire (West Riding)	1	Nil	Nil	5/–	—	—

Manufacturing Companies.

Assoc. Elec. Ord.	1	6	4	18/3	—6d.	4 7 8
Do. Pref.	1	8	8	30/–	—	5 6 8
Babcock & Wilcox	1	14	14	38/9xd	—2/6	—
British Aluminium Ord.	1	10	5	27/6	+6d.	3 12 9
British Insulated Ord.	1	15	15	65/–	—	4 12 4
Brush Ord.	Stock	5	Nil	32	—	—
Callender's	1	15	15	3⅛	+1/6	4 17 10
Do. 6½% Pref.	1	6½	6½	27/6	—	4 14 6
Crompton Parkinson Ord.	5/–	30	24	21/3	—1/6	5 13 0
Do. 8% Pref.	1	8	8	30/–	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	23/3	—	6 9 0
Do. 5% Deb.	Stock	5	5	100	—	5 0 0
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	4⅛	—	5 12 8
English Electric	1	Nil	Nil	10/9	—	—
Do. do. Pref.	1	Nil	Nil	13/9	+1/6	—
Ever Ready	5/–	35	35	28/3	+9d.	6 4 0
Ferranti Pref.	1	7	7	24/–	—	5 16 8
G.E.C. Pref.	1	6½	6½	28/–	—	4 12 10
Do. ord.	1	10	8	41/3	—	3 17 6
Henley's	1	30	30	6⅛	—	4 19 0
Do. 4½ Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	3/9	—	—
Johnson & Phillips	1	10	5	1⅛	+1/6	4 4 2
Siemens Ord.	1	7½	7½	25/9	+1/6	5 16 6
Telegraph Construction	12	Nil	Nil	11	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of Chartered Patent Agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1931

11489. "Amplifying or detecting circuits employing a screened valve." Gramophone Co., Ltd., and C. S. Bull. April 17th, 1931. (380827.)

16269. "Vapour pumps such as diffusion pumps." General Electric Co., Ltd., and E. Gallizia. June 4th, 1931. (380780.)

16495. "Apparatus for producing sounds of a musical character." A. H. Midgley. June 5th, 1931. (380781.)

16973. "Ticket-issuing apparatus." Ericsson Telephones, Ltd., and G. J. Larsson. June 11th, 1931. (380785.)

17136. "Apparatus for the remote control and supervision of adjustable members in a sub-station from a main station." Siemens & Halske Akt.-Ges. June 13th, 1930. (380788.)

17175. "Method of and apparatus for controlling the operation of railway switch-points." British Power Railway Signal Co., Ltd., and R. Mordin. June 12th, 1931. (380798.)

17287. "Electricity meter." Landis & Gyr Soc. Anon. (Addition to 275628.) June 17th, 1930. (380829.)

17396. "Apparatus for the manufacture of electric dry cells." H. A. Bumke Ges., and Autom. Spezial-Maschinen Ges. August 5th, 1930. (380801.)

17572. "Protective cut-out systems." Westinghouse Electric and Manufacturing Co. June 19th, 1930. (380808.)

17717. "Electromagnetic devices, particularly electrodynamic acoustic devices." Western Electric Co., Ltd., and Electrical Research Products, Inc. (Bell Telephone Laboratories, Inc.). (Addition to 333578.) June 18th, 1931. (380811.)

17730. "Control of compound-wound electric motors." L. Bacqueyrisse. June 26th, 1930. (380803.)

17895. "Wall boxes for electric switches, plugs, or the like." Wallsall Conduits, Ltd., and A. E. Read. June 20th, 1931. (380791.)

18234. "Highly emissive thermionic cathode." Radioakt.-Ges. D. S. Loewe, and Dr. O. Emersleben. June 25th, 1930. (380835.)

18282. "Television systems." Electrical Research Products, Inc. June 28th, 1930. (380839.)

18364. "Directional aerial system." Standard Telephones and Cables, Ltd. November 21st, 1930. (380842.)

18531. "Thermionic valves with indirectly heated cathodes." M-O Valve Co., Ltd., and C. W. Cosgrove. June 26th, 1931. (380846.)

18551. "Submarine cables." Electrical Research Products, Inc. June 25th, 1930. (380848.)

18552. "Electric glow-discharge lamps." Electrical Research Products, Inc. June 26th, 1930. (380849.)

18767. "Cathode-ray discharge devices for television and other signalling systems and the like." Electrical Research Products, Inc. July 7th, 1930. (380859.)

19003. "Cooling of mercury rectifiers having glass envelopes." Soc. Anon. Hewittic and M. Demontvignier. July 3rd, 1930. (380863.)

19458. "Cooling of mercury rectifiers having glass envelopes." Soc. Anon. Hewittic and M. Demontvignier. (Addition to 380863.) November 26th, 1930. (380872.)

20034. "Radio signalling systems." E. H. Armstrong. July 30th, 1930. (380876.)

21075. "Apparatus for the electrical treatment of gases." Whessoe Foundry & Engineering Co., Ltd., and A. G. Grant. July 23rd, 1931. (380890.)

21285. "Clocks driven by synchronous electric motors." Landis & Gyr Soc. Anon. July 26th, 1930. (380891.)

21561. "Electric luminous discharge devices." British Thomson-Houston Co., Ltd., L. J. Davies, and H. de B. Knight. July 28th, 1931. (380895.)

22378. "Electrically operated liquid-fuel burner mechanism." W. W. Triggs (William Oil-O-Matic Heating Corporation). August 7th, 1931. (380904.)

24585. "Galvanic batteries." Oldham & Son, Ltd., and H. Holt, Junr. September 1st, 1931. (380922.)

26657. "Electric insulators." Steatite & Porcelain Products, Ltd., and G. H. Halton. September 24th, 1931. (380943.)

26965. "Means for operating a plurality of electric switches by a single operating member." Arrow-Hart & Hegeman Electric Co. October 30th, 1930. (380947.)

29378. "Telephone or like electric cables." W. P. Williams (Hackethal Draht und Kabel Werke Akt.-Ges.). October 22nd, 1931. (Convention date not granted.) (380969.)

30330. "Means for assembling individual units of electric dry cells to form a battery." W. G. Ikin. November 3rd, 1930. (380980.)

30429. "Aerial fuse fittings and adjusting means therefor." English Electric Co., Ltd., and A. M. Pooley. November 3rd, 1931. (380982.)

32321. "Automatic ignition control for internal-combustion engines." R. Bosch Akt.-Ges. (Addition to 359832.) December 13th, 1930. (380995.)

33901. "Safety device for miners' electric lamps." W. Wahl. December 7th, 1931. (381013.)

34260. "High-tension condensers." Telefonaktiebolaget L. M. Ericsson. January 31st, 1931. (381017.)

34617. "Polyphase asynchronous motors." J. W. Barthe. December 13th, 1931. (381019.)

34710. "Electric switches with arc-extinguishing chambers." Akt. Ges. Brown, Boveri et Cie. December 20th, 1930. (381021.)

35076. "Electric light globes." Fa Deutsch. December 18th, 1931. (381024.)

35098/9. "Radio apparatus." Grigsby-Grunow Co. August 3rd, 1931. (381025/6.)

35595. "Machines for making incandescent electric lamps and the like." British Thomson-Houston Co., Ltd. December 27th, 1930. (381031.)

1932

11. "Multiple-core insulated electrical conductors." M. H. Goldstone. January 1st, 1932. (381038.)

712. "Spring driving-means for impulse transmitters of the dial type for automatic telephone systems and the like." M. B. Richter. January 9th, 1932. (381044.)

913. "Arrangement in the cathodes of metal-vapour rectifiers." Allmanna Svenska Elektriska Aktiebolaget. January 12th, 1931. (381045.)

1371. "Receivers for ultra-short waves." C. Lorenz Akt.-Ges. January 31st, 1931. (381048.)

1463. "Method of electrolysis with the use of a mercury cathode." K. W. Palmaer. April 30th, 1931. (381049.)

3688. "Voltage regulators comprising triodes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. February 26th, 1931. (381060.)

4316. "Electrical operations relating to line contactors used with tramway-point turners, railway signals, and other like mechanism." S. T. Quilliam. February 13th, 1932. (381065.)

4676. "Electrical motors, more particularly for windscreen-wipers." R. Bosch Akt.-Ges. February 25th, 1931. (381067.)

6285. "Mercury sealing means for use with boxes containing electrical mechanism or appliances." S. T. Quilliam. March 2nd, 1932. (381077.)

6942. "Devices for the generation of ultra-violet rays." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 9th, 1931. (381084.)

7129. "Methods of generating high-frequency electrical energy." Compagnie Générale de Télégraphie Sans Fil. March 9th, 1931. (381087.)

7436. "Vessels for impregnating electric insulation elements." International General Electric Co., Inc. March 12th, 1931. (381089.)

10794. "Charging of radio high-tension accumulators from the low-tension accumulator or accumulators without disconnection from the radio-receiver." J. Wood. April 15th, 1932. (381107.)

10870. "Arc welding and cutting processes." M. Zack. April 17th, 1931. (381108.)

10958. "Variable tappings on transformer and the like windings." English Electric Co., Ltd., and G. F. Stearn. April 16th, 1932. (381109.)

11077. "Electric vacuum switches." International General Electric Co., Inc. April 16th, 1931. (381110.)

11081. "Electric distribution systems." British Thomson-Houston Co., Ltd. April 17th, 1931. (381111.)

12206. "Ignition coils." R. Bosch Akt.-Ges. May 19th, 1931. (381117.)

12649. "Metal-vapour rectifiers." Akt.-Ges. Brown Boveri et Cie. May 4th, 1931. (381120.)

12983. "Suction cleaners." Hoover, Ltd. July 18th, 1931. (381121.)

13319. "Controllers for electric motors." Igranic Electric Co., Ltd. May 11th, 1931. (381123.)

14520. "Electric motor generators." W. E. Masterson and H. Price. May 21st, 1932. (381131.)

15458. "Sound-recording or sound-reproducing machines." Electrical Research Products, Inc. August 28th, 1931. (381134.)

16782. "Thermo-couples." G. Siebert Ges. June 20th, 1931. (381137.)

18513. "Electric incandescent lamps, electric discharge devices, and the like." General Electric Co., Ltd. July 1st, 1931. (381142.)

18647. "Recording of sound." British Acoustic Films, Ltd. September 26th, 1930. (Divided application on 8541/30.) (380850.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be lodged within one month from October 12th:—

Telcon, T.C. & M., Ltd. (lettering and design). No. 533889. Class 5. Unwrought and partly wrought metals used in manufacture. No. 533890. Class 8. Philosophical and scientific instruments and apparatus for useful purposes. No. 533891. Class 13. Metal goods. No. 533892. Class 47. Goods manufactured from india-rubber and gutta-percha. No. 533893. Class 50. Electric insulating materials.—Telegraph Construction & Maintenance Co., Ltd., 38, Old Broad Street, E.C.2.

MEC (lettering and design). No. 527818. Class 8. Fitted electrical switchboards, automatic switches, h.p. oil switches, current transformers, electrical motor control panels and dimmer switches.—Mudie's Electrical Co., Ltd., Shaftmoor Lane, Birmingham.

Fillex. No. 532704. Class 8. Radio receiving sets and parts thereof.—L. & J. Fabian, Ltd., 14, Bath Street, E.C.1.

Solostat. No. 532794. Class 8. Sound reproducing and recording apparatus, radio-telephonic apparatus, &c., and parts thereof.—Universal Rubber Co., Ltd., 34-36, Kingsland Road, E.2.

The Harlequin (lettering and design). No. 533910. Class 8. Radio receiving sets.—Hedingham Radio, Ltd., Swan Street, Sible Hedingham, Essex.

Neon-Lux (lettering and design). No. 534777. Class 8. Neon-electric signs.—R. T. Marris, 24, Chapel Street, Liverpool.

Byflex. No. 534281. Class 13. Electric lamps (ordinary).—Lissen, Ltd., Worple Road, Isleworth, Middlesex.

Winlite. No. 534717. Class 13. Electric lamps (ordinary).—Windsor Works, Ltd., 68, Venn Street, Clapham Common, S.W.4.

Animal and Lamp (design only). No. 534858. Class 13. Electric lamps (ordinary).—Aurora Lamps, Ltd., Ferry Road, Old Kirkpatrick, Dumbartonshire.

Disco. No. 533526. Class 18. Electric cooking and toasting stoves, and electric radiators.—Newcastle and District Electric Lighting Co., Ltd., 81, Westgate Road, Newcastle-on-Tyne.

A 2,000,000-V Russian Laboratory

According to the *Moscow Daily News*, a high-voltage laboratory capable of conducting electrical tests up to 2,000,000 volts—stated to be the first of the kind in Russia—is at present in course of construction at the Electrophysical Laboratory in Leningrad.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Bungalows (150); Bisset & Sons, Ltd., Aberdeen.
Accrington.—Houses (75), Aireworth; Wright & Wright, solicitors for Edmund Laycock trustees.
Acton.—Houses (35), Western Avenue, for Carter Paterson; Atherton & Co.
Appledore (KENT).—Rebuilding Lion Inn; Style & Winch, Ltd., Medway Brewery, Maidstone.
Axholme.—Houses (66); R.D.C. surveyor.
Barrow-in-Furness.—Houses (32), Ancaster Street; J. H. Lines and Co.
Beaconsfield (BUCKS).—Houses (40) for U.D.C.; R. Cain and Co., builders, Hounslow.
Birkenhead.—Development, Walker Park Estate; Layton and Co.
Birmingham.—Houses (620), Wooley Castle Estate; Henry Boot & Sons, Ltd. Rehousing, New Summer Street area (£85,000); city engineer.
Bristol.—Secondary school, Novers Hill, Bedminster, for the E.C. Church, Knowle Estate; Baptist trustees.
Burnley.—Houses (60), various sites; borough engineer.
Chesterfield.—Abattoir (£12,698); G. F. Kirk, Ltd.
Congleton (CHESHIRE).—Houses (100); borough surveyor. Waterworks pumping station for R.D.C.; Herbert Lapworth, engineer, 25, Victoria Street, S.W.1.
Derby.—Cinema, The Spot; Browning & Hayes, architects, Iron Gate. Rehousing scheme, Exeter Place; borough surveyor.
Dorchester.—Houses (32); borough surveyor. Business stores, South Street, for the International Tea Co., Ltd. (Kearley and Tonge), Mitre Square, London.
Dumbarton.—Power house, &c., for Dumbarton Greyhound Racing Co.; T. G. Muir.
Duns (BERWICKSHIRE).—Cinema, South Street, for Michael Burn.
Ealing.—Factory for Perivale Engineering Co., Ltd., Wadsworth Road; T. P. Bennett & Son, architects, 41, Bedford Row, W.C. School, Perivale, for the E.C. Houses (68), Empire Road and Bilton Road, for Taylor Woodrow, Ltd.; J. M. Wilson, architect, Hayes, Middlesex. Houses (178), Fraser Road; G. Wimpey & Co., Ltd., The Grove, Hammersmith.
Eastbourne.—Houses (56), Churchdale Road and Victoria Avenue; borough engineer.
Essex.—Junior school, Beam Bridge, Dagenham (£24,538); J. Stuart, county architect, Chelmsford.
Farnham.—Cinema, East Street; Regal (Farnham) Cinema Co., Ltd.
Folkestone.—Houses (50); borough engineer.
Glasgow.—Houses at Temple for Corporation; architect, Housing Department. Houses (200), for Western Heritable Investment Co., Ltd.; J. Wilson, architect, 141, Bath Street.
Grays (ESSEX).—Church for St. John's, Little Thurrock; Rev. J. C. Nunns, curate-in-charge, Little Thurrock, Grays.
Greenford (MIDDLESEX).—Houses (87), Cuckoo Dene, for Tucker & Warren; R. J. Ward, architect, 107, Uxbridge Road, W.5.
Hamble (SOUTHAMPTON).—Re-erection of works (electrically equipped) for the Fairey Aviation Co., Ltd., Hayes, Middlesex.
Haydock (LANCS).—Houses (100); U.D.C. surveyor.
Hertford.—Cinema, Ware Road and London Road, for the Hermitage Cinema Syndicate.
Hertfordshire.—Extensions, including new infirmary, Ware Institution, for the P.A.C.; C. Ernest Elcock, architect, Windmill Hill House, Windmill Hill, London, N.W. Schools, Watford (£37,700), Mill End (£36,757), and St. Stephen (£9,000); director of education, Hertford.
Highworth (WILTS).—Houses (38) for R.D.C.; R. J. Beswick and Son, architects, 10, Victoria Road, Swindon.
Hindley (LANCS).—Houses (84); U.D.C. surveyor.
Hornchurch.—Church; Rev. J. B. Carlos, Vicar of Holy Cross, Hornchurch Road, Romford.
Horsham.—Houses (100); U.D.C. surveyor.
Hoyland (YORKS).—Houses (30) for U.D.C.; John Parr and Sons, builders.
Hyde.—Houses (38), Back Bower Estate; borough surveyor, Town Hall.
Ilford.—Extensions, Chadwell school (£20,960), and new school, Fairlop (£29,985); G. H. Miller & Co., Forest Gate. Houses (42), Middlefield Gardens, and shops, Woodford Avenue; J. Aldridge. New Church of St. Vincent, Waldegrave Road; Scoles & Raymond. Houses (116), Dawlish Drive and Ashburton Avenue; F. Sykes.
Keighley.—Houses (75); Burr, Sugden & Co., solicitors.
Kettering.—Methodist Church; C. Saunders, architect, Bank Chambers, 13, High Street, Kettering.
Kilmarnock.—Rehousing scheme (48), Riccarton, for the T.C.; Robert Armour, 38, Bank Street.
Kirkcudbright.—Electrical work for houses; borough surveyor.
Lanarkshire.—School (£9,000), Newton; director of education, Lanarkshire House, Glasgow.
Leeds.—Houses (265). Sutton Trustee Estate, off Selby Road; Chorley, Gribbon & Foggitt, architects. Electrical apparatus for stage, &c., Grand Theatre; manager.
Leek.—Houses (40) for U.D.C.; W. J. Simms, Sons & Cooke, Ltd., builders, Nottingham.
Leith.—Re-erection of warehouse, West Bowling Green Street, for J. & A. Wyllie, Ltd. (£20,000 to £30,000).
Littlehampton.—Housing scheme, Thornscroft Estate; U.D.C. surveyor.
London.—(BETHNAL GREEN).—Tenements, Claredale Estate (£18,500); borough engineer. (EAST HAM).—Church; Rev. R. P. Wernham, St. Paul's Vicarage, East Ham. (LIMEHOUSE).—Cinema, Commercial Road East; G. Coles, architect. (TOTTENHAM).—R.C. school, White Hart Estate; Rev. C. Sowerby, 729, High Road, Tottenham. (WANDSWORTH).—Factory, Duntshill Road, Springfield; Fairweather & Ranger, contractors, 630, Garratt Lane, S.W.17. Laundry, Frogmore, for Castle Laundry, Ltd.; Fleetwood, Eversden & King, surveyors, 3, New Court, W.C.2.
Luton.—Works and plant extensions (£500,000) for Vauxhall Motors, Ltd.
Maltby (YORKS).—Houses; Mollekin Bros. (38), W. H. Gilbert (42) and H. Boot & Sons (28), builders.
Middlesbrough.—School, Emmerson (£24,645); S. Moffett, director of education.
Montgomeryshire.—School, Arddleen; Llewelyn Phillips, director of education, Newtown.
Motherwell.—Houses (188) at Craigneuk; burgh surveyor.
Nantwich.—Houses (73); Fletcher & Sons, 29, High Town, Crewe.
Newcastle-on-Tyne.—Church and parish hall, Walker; C. F. Murphy, architect, Lloyds Bank Chambers, Morpeth. Cinema (1,238 seats), Two Ball Lennen Estate; J. H. Morton & Sons, architects, Fowler Street, South Shields.
New Malden.—St. James's Church (£11,600); J. E. Newberry, architect, Parliament Mansions, S.W.1.
Pendleton.—Houses (287), Swinton Park and Lancaster Road, Pendleton, Manchester; J. Lane & Sons, Ltd., Manchester Road, Pendlebury.
Pickering (YORKS).—Houses (32), for the U.D.C.; Mr. Potts, builder, Norton-on-Tees.
Plymouth.—Houses (215) and flats (28), Barne Barton Estate; Theo Conway, Ltd., contractors, Weymouth. Houses (43), Victory Street, and Tamar Cottages; St. Aubyn Estates, Ltd.
Putney.—Flats (14 blocks), North House Estate; John Laing and Son, Ltd., "Parklands," Mill Hill, N.W.7.
Rawmarsh (YORKS).—Houses (100); England & Co., builders, Attercliffe, Sheffield. Bungalows (24), Rockliffe Road; J. A. Jonge, surveyor, Council Offices, Parkgate.
Rickmansworth (HERTS).—Houses (44); A. Freeman, U.D.C. surveyor.
Rochester.—Houses (250). Temple Farm Estate, Strood; Economic Housing Association, Ltd.
Romford.—Houses (45), Lynton Avenue, for T. Blade. Houses (18), Mashiters Walk, for W. H. White.
Rotherham.—Houses (200) for T.C.; E. O. Weaver, builder, Mexborough.
Rowley Regis (WORCS).—Houses (154); U.D.C. surveyor.
Scarborough.—Extension, North Bay Promenade (£30,000); H. W. Smith, borough engineer, Town Hall.
Southall.—Houses, Ryecroft Road (53), Lawson Road (49), and Rutland Road (36); G. Wimpey & Co.
Southampton.—Flour mill; Joseph Rank, Ltd. Schools, Shirley Warren (£18,500) and Merry Oak (£17,600), for the Borough E.C.; F. L. Freeman, secretary.
Southend-on-Sea.—Junior and infants' schools (£28,635), for the Borough E.C.; L. G. Davies, builder, Woodford Green.
Stockport.—Houses (92), 20 blocks of flats, Bates Ley Farm site, Adswood; W. F. Gardner, borough surveyor, Town Hall.
Sunbury-on-Thames.—Houses (70), Leonards Orchard Estate, for L. J. Taylor & Sons.
Sunderland.—Houses (442); borough engineer.
Sutton and Cheam.—Houses (70), Worcester Park; U.D.C. surveyor.
Sutton Coldfield.—Houses (35), Haslor Road; Streathers, Ltd.
Tamworth.—Houses (194), Bolehall site; borough surveyor.
Thornaby-on-Tees.—Houses (100); Handel-Kay, surveyor, Town Hall.
Torquay.—Development (180 acres) of Cockington Estate; G. H. Jenkins, estate architect. Reconstruction, Royal Theatre, Abbey Road; W. G. & E. Vickery, Ltd.
Twickenham.—Houses (118) for T.C.; Eadie & Co., builders. Refuse destructor works; borough surveyor.
Upton-on-Severn.—Houses (174); R.D.C. surveyor.
Walton-on-Thames.—Houses (24); U.D.C. surveyor.
Warrington.—Houses (32), Reynolds Street; Clough & Gaskell, Wigan.
Watford.—Houses (150), Leavesden Green Estate; borough surveyor.
West Dean (GLOS).—Houses (30); R.D.C. surveyor.
Westgate-on-Sea.—R.C. church; Rev. W. Upson, The Presbytery, Canterbury Road.
West Wickham.—Cinema; J. Stanley Beard, architect, 101, Baker Street, London.
Wigan.—Houses (24), Whelley; W. A. Walker, borough engineer, Municipal Buildings, Library Street.

Light-ray Timing at Newmarket

The light-ray timing of horse races at Newmarket is the latest development of Radiovisor Parent, Ltd. The starting gate is provided with switching apparatus from which an underground cable is led to the judge's box. The release of the gate automatically starts the chronometer. At the finish a beam of light which is projected across the course at the winning post is intercepted by the leading horse and the chronometer is automatically and instantly stopped, and remains indicating the time of the race. The judge or timekeeper has in front of him a compact unit having only two push buttons for setting the apparatus and resetting the clock. A false start is immediately indicated by the reappearance of a signal after the race has begun, when the clock merely has to be reset in readiness for the next start.